Paper Outlook for 1924 Bullish

THE paper markets generally have been dull and declining, more or less, since last July. However, a sharp break occurred this week, when some of the leading eastern and western mills, making Kraft wrapping, cut their prices sharply. In our judgment this will have a very clarifying effect, due to the fact that there was great uncertainty as to whether the leading mills in the industry would make any change in their prices until after the first of the year.

Large volumes of business have been withheld. Consumers, for the past two months, have been ordering from hand to mouth. In the meantime business has been piling up, and with a prediction of the biggest holiday business in the history of the U. S. lying ahead of us, and largely increased amounts of paper certain to be used, and with prices having now reached a cost basis at the mills—there is no question but that any turn in the volume of general business will produce a rising market.

Stocks of paper in the hands of paper merchants have been consistently reduced, both because of the fear of drastic cuts and because of a desire to enter the first of the year with as little stock as possible. With all the paper merchants figuring the same way, and consumers also emptying their reservoirs, and the certainty of constantly increasing volume of business throughout the winter—it spells a certain big demand on the mills for large quantities of paper after the first of the year.

Added to this is the fact that the entire north temperate zone has had a severe draught this year; and now with the streams in Wisconsin, Michigan, Northern New York, New England and Canada freezing up with the lowest water in years; and with the curtailment of between 550 and 600 tons of newsprint production per day; and added to this the fact that because of the dull period experienced from July 1st to November 1st and the reluctance of consumers in the United States to purchase Scandinavian and German Kraft pulp and paper in any quantities; and with the closing of the Baltic Sea November 15th, which makes sure that there will be no shipments of paper from that part of the world to America until the first of next May—all these conditions are additional factors toward the making of a big bull market in 1924.

Fig. 1021
Iron Body "Ferrosteel"
150 lbs. pressure
450° F. total temperature

Fig. 1120
Iron Body Bronze Mounted
Standard 125 lbs. pressure
450° F. total temperature

Fig. 73
Bronze "Ferrosteel"
200 lbs. pressure
Fig. 18 300 lbs. pressure
350° F. total temperature

LUNKENHEIMER

Globe and Angle Valves

Small or large, for low or high pressures or temperatures, of Bronze, Iron Body Bronze Mounted, Steel Monel Mounted, or of All Iron for handling fluids which attack bronze alloys, a design particularly adapted for the purpose can be found in the comprehensive line of LUNKENHEIMER GLOBE AND ANGLE VALVES.

The completeness of the line makes possible standardizing on Lunkenheimer Valves with that resultant prolonged satisfactory service and economy of maintenance provided only by the Lunkenheimer method of manufacture.

For complete information write for a copy of Catalog 58.FG.

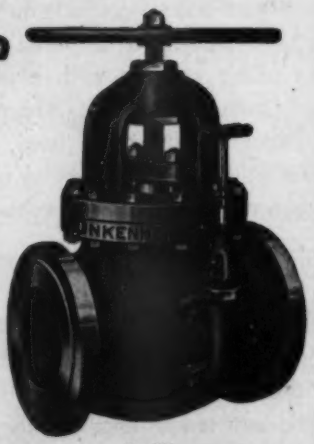


Fig. 622
Iron Body Bronze Mounted
Extra Heavy 250 lbs. pressure
450° F. total temperature

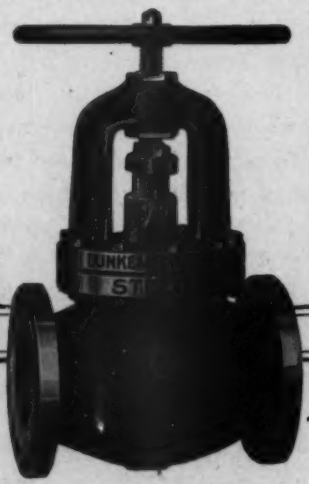


Fig. 606
Steel, Monel Mounted
300 lbs. pressure
800° F. total temperature

"America's Best since 1862"

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U.S.A. BOSTON LONDON
EXPORT DEPT. 128-135 LAFAYETTE ST., NEW YORK

LUNKENHEIMER PRODUCTS

A comprehensive line of Engineering Appliances offering a type and size to meet all prevailing conditions.

VALVES

Bronze, Iron, Steel; Globe, Angle, Cross, Check, Gate, Throttle, Non-return, Blow-off, Pop Safety. Relief, Whistle, etc.

BOILER MOUNTINGS

Non-return, Pop Safety and Blow-off Valves; Water Columns, Water Gauges and Gauge Cocks, Injectors, Low Water Alarms, Fusible Plugs.

LUBRICATORS

For Steam, Gas, Gasoline, Oil, Compressor and Pump Cylinders; Gravity Feed or Hydrostatically. Hand or Mechanically Operated.

OIL AND GREASE CUPS

Glass or Bronze Body Oil Cups with or without Sight-feed; Automatic Feed, Cap or Plunger Screw Feed Grease Cups of Bronze, Iron or Steel.

Whistles, Cocks, Pipe Fittings, Unions, Ejectors, Air Nozzles, Automotive Accessories, Etc.

1300-23-07

EDITORIALS

On Wisconsin

WITHIN the last thirty days, an event has occurred which might prove to be the means of blazing the trail for a march of progress toward the goal of a great national reforestation program.

Through the efforts of the American Paper and Pulp Association in co-operation with the Wisconsin paper and pulp manufacturers, a permanent organization has been formed in that state known as the Wisconsin Forest Protective Association, whose primary purpose will be the consideration of forest protection. The movement has received the entire approval of the State officials, having to do with taxation, conservation and forestry, and much confidence is felt that a workable method will soon be formulated through the co-operation of the Association with the State legislators, whereby adequate means can be practically provided to protect the large areas of timberland in that State.

Money must be provided with which to protect from fire, by the maintenance of an adequate patrol system, the forests that are now standing. Whether such funds can be raised and maintained by the manufacturers themselves, or should be paid by the State through a special tax levy on timberland owners, or by a general per capita taxation, will be a matter for consideration.

One thing is certain at least—the burden of cost for timberland protection must be laid on the cord price to the ultimate consumer. The public must pay and the public is paying. Whether it will eventually pay less through an expenditure of money sufficient to protect the wood which is already standing, and thereby insure a continued supply, or being confronted sooner or later by a timber exhaustion, so far as its economic use is concerned, is a question that requires little thought to determine.

The point is that forest destruction is more costly than forest protection. A steady expenditure for an adequate patrol is more economical than a chance that no fire will occur.

The owner of timberlands is now paying more through fire loss than it would cost to protect it, and the sooner this is realized the better and stronger will be the country's future of a dependable and economical timber supply.

The Wisconsin paper and pulp manufacturers are to be congratulated for this progressive step toward timber control, and in this we are reminded that they stand well in the front as a leading group in the pulp and paper industry of America.

An additional thing which determines this is their interest in vocational education. A large mill in this state is successfully carrying on a well prescribed course of instruction including one on pulp and paper manufacture. The text books which are used for the latter are those which have been compiled by the Educational Committee of the American Paper and Pulp Association, and is a testimony of respect to their value as well as a demonstration of putting into work that for which much labor and money has been expended.

Our Wisconsin brothers take a leading part in the activities of the American Paper and Pulp Association, and in this connection let it not be overlooked that the first joint meeting of the working bodies of the Association—Superintendents, Tappi and Cost Accountants—took place at Appleton. The success of the latter has proven beyond doubt that much good can be derived from the combined efforts of these bodies.

Yes, we say, "On Wisconsin!"

Thanksgiving Time

EACH year, the last Thursday of November is set aside as a day of Thanksgiving, and everyone is supposed to refrain from all unnecessary labor, and devote the day to thinking of better things than we usually do most of the other days in the year.

Thanksgiving Day is a wonderful institution; but why not make every day a day of thanksgiving? Some of us, at times, feel that we do not have much to give thanks for, and some of us seem to feel that we have no one to thank, but this is all wrong. We all have Life, and surely we should be grateful for this. Most of us have good health, and this is surely pleasant. We all have an abundance of the good things of this life, all that we need or can use. We have homes, families, friends, and one thousand other things for which we should be grateful.

Let us, therefore, give thanks and be grateful on Thanksgiving Day, but let us also be grateful every other day of the year, grateful to the Ruler of the Universe, who provides us all with all for which we have need.

The Paper Industries Exposition

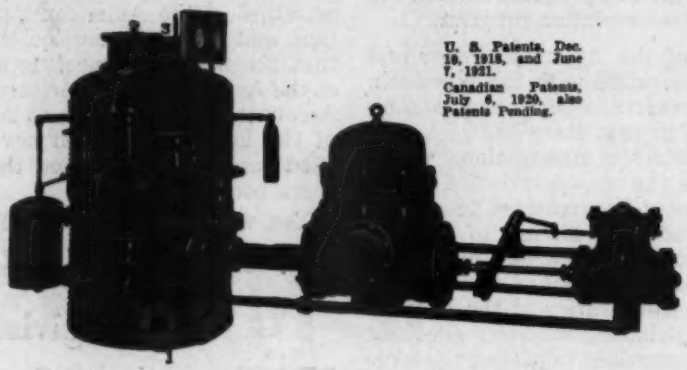
THE second annual Paper Industries Exposition will be held in the Grand Central Palace, New York City, at the same time of the big spring meetings of the American Paper & Pulp Association as was the case last April.

The first Exposition was somewhat in the way of an experiment, but it proved to be a big success, and we are sure the next one will be of vastly more importance than was the first.

This Exposition can be made a tremendous force in an educational way in this industry, and deserves the support of every paper and pulp manufacturer and every firm that wants to sell to these manufacturers.

"Be Up To Date"

Increase Your Production—Cut Drying Costs



U. S. Patents, Dec. 10, 1918, and June 7, 1921. Canadian Patents, July 6, 1920, also Patents Pending.

The FULTON Forced Vapor Circulating System

Keeps All Water and Air Out of Dryers

Your paper machine can reach its maximum production at the lowest cost only when equipped with the foremost system of removing the air and water from the dryers.

We Stand Squarely Back of All Our Installation with an Iron Clad Guarantee

Not necessary to stop production while installing The Fulton Circulating System since only three connections are necessary.

Why not ask us what we can do for your machine—it costs nothing

The Cost of Experimenting Is High

FULTON ENGINEERING COMPANY
MIDDLETOWN, OHIO

THE PAPER INDUSTRY

REG. U. S. PAT. OFF.

Vol. 5 NOVEMBER, 1923 No. 8

Systematic Safety Work

By H. M. GRASSELT

TO PROTECT life, limb and health and to make every industry a safe place to work in is the humane mission of the Safety First Movement. Although much has been accomplished during the past few years and the number of accidents in industries has decreased proportionately, much remains yet to be done, and eternal vigilance is necessary to mark progress. Effective industrial safety work and its perpetual application rest upon the true understanding of its three principal fundamentals; viz., Safety Devices, Methodical Inspection and Safety Education.

Between theory and praxis in safety work there should exist no disparity. Yet a comparison of conditions in many plants will evince a decided neglect of the practical end, though the theoretical part—that is, posters with appealing pictures and slogans, safety literature and committees—may be in evidence throughout the entire establishment. No act of legislature or law will accomplish more in industrial safety than the correlated efforts of management and employees. In safety work, like elsewhere in industrial life, results depend in a large measure upon team work and co-ordinated endeavor. Each plant will have its individual problems. Constructive thinking and methodical study of these problems is, therefore, indispensable to the perpetual application of the safety first idea.

Safety Devices

Safety devices, one of the three principal fundamentals of safety work, are provided to remove all hazards and prevent accidents through the elimination of actual contact with danger points. Buildings, elevators, stairways, machinery and equipment consequently require continual examination as to safeguarding. To enumerate the individual factors and point out their respective hazards would require space beyond the scope of an article. Hence, just a few characteristic danger points and their elimination will be mentioned in the following lines:

The plant should be kept free from rubbish at all times, floors swept frequently and scrutinzed for protruding nails. Many employees in paper mills go barefoot, and a rusty nail stepped upon may cause them serious trouble.

Plants must be properly lighted and artificial light effectively distributed. Stairways and dangerous places and corners require special attention because of their increased accident hazards. Correct light distribution is not only a prominent factor in the prevention of accidents and preservation of the employee's eyesight, but it is also a stimulant to better and greater production.

It is necessary to guard floor openings with railings or provide them with safety covers with flush hinges. Many buildings have wall openings, which in hot days are used for ventilation and consequently require railings and doors.

Fire escapes have to be kept unlocked and their accessibility must not be impaired by using passageways for storage purposes.

Oiling runways and elevated platforms and runways must be provided with railings and toeboards and properly lighted at all times. Rails and treads of stairs should be easily seen at all times; if not, artificial light must be provided to produce that condition. Special care has to be taken to always keep the treads firmly secured and in good condition; they should never be slippery or dirty and with protruding screws and nails.

Elevators contribute a goodly share to industrial accidents. Passenger traffic should be strictly forbidden on elevators other than those built expressly for that purpose. Elevator shaftway entrances have to be enclosed at each landing and provided with gates or doors, which should always be locked when not in use. Gates should be hinged, sliding or swinging and self-locking. An interlocking device, which will prevent the elevator car from being moved away from the landing before doors or gates are closed, is essential to safety. Furthermore, each landing

should be adequately illuminated and a mechanical working signal system should be required in either the elevator car itself or on the shaftway.

Many accidents result from insufficient safeguarding of the various styles of saws used in paper mills. Circular saws, for instance, should be provided with a hood or guard which will cover the saw, permitting, of course, a view of the saw blade while it is in use. A splitter or viving knife must be back of the blade and the guard securely attached and difficult to remove. The crankshaft of the jig saw must be enclosed and guarded, as well as the upper and lower wheels and all portions of the blade, except the part between sliding guide and table. Swing saws have to be provided with a hood that will cover one-half or more of the saw disc and a chain or emergency stop, which will prevent the saw from swinging beyond the front edge of the table.

Remarkably many accidents occur on calenders, ranging from a slight squeezing of finger tips to loss of hands and arms. In cleaning calender rolls when in operation, the fingers should never come in contact with them, but a sort of a brush on a stick should be used, by which the work may be done with perfect safety. Calender guards and feeding devices are to be arranged in such a way that the materials may be fed into the machine without permitting the fingers of the operators to be caught in the rolls. Embossing and graining machines are to be guarded similarly.

Special protection and safeguards are required for cranks, connecting rods, cross heads, tail rods, gears, governor belts, contact points of belts and pulleys and exposed ends of machine shafts. Flywheels have to be enclosed, and keys and other projections in the rim are to be covered if they are not protected by a solid enclosure.

Protection of eyes of workers performing operations which endanger their safety is absolutely necessary. Goggles—if advisable, colored ones in order to remove the effect of glare—should be provided for those employees, and it should be insisted that they are worn during the performance of hazardous work.

Rag cutters and thrashers, paper machines, cutters and other equipment require standard safeguarding to prevent accidents and to render the work safe. Paper machine slitters, for instance, should be guarded so as to make it impossible for the fingers to come in contact with the cutting edges during the operating of the machine.

Safety work embraces also protection of health and personal cleanliness. Sanitation, washing and toilet facilities should consequently receive constant attention, and improprieties must be remedied immediately. Fresh air, plenty of light, a clean plant with frequently whitewashed walls and clean windows are essential factors in the employees' well-being and welfare and conductive to good cheer and contentment. A loyal force and quality and quantity production are the logical results and well-paying returns for efforts made in that direction.

Methodical Inspection

To always keep safety devices and safety work up-to-date and effective necessitates weekly inspection by a specially appointed inspector and monthly inspection by a safety committee.* Needless to say, the inspector has to be a person thoroughly acquainted with the requirements of safety work. The safety committee should consist of one man from each department and meet monthly. Inspections and recommendations by that body of employees should be made independently of those made by the regular inspector.

Inspectors should fill out an inspection blank, such as furnished by the various insurance companies. The following "Safety Inspection Report" for use in industrial plants** is being used in many paper mills and has proved adequate and serviceable:

The form has space for the insertion of the date of inspection and date of last inspection, location of the plant and names of inspectors or committee. It covers the inspection of

A—Fire Hazard: (a) Are all fire fighting appliances, including tanks, fire escapes, etc., ready for immediate use? (b) Is plant kept free from excess inflammable waste and rubbish?

B—Floors, Floor Openings, Wall and Hoistway Openings. Note the condition of floors; see that floor surface is free from protruding nails, splinters, holes, slipperiness, unevenness and loose boards, and that all openings are properly guarded.

C—Stairs: State condition of support and treads. Note if light is sufficient, if treads are badly worn, etc.

D—Elevated Runways and Platforms. Note if in good condition, clear of obstructions, etc.

E—Boilers, Pressure Apparatus, Steam, Gas and Oil Engines. Note conditions of valves, piping, etc.

F—Electrical Equipment. Note condition of switchboard, transformers, wiring, etc., and see that they are properly isolated.

G—Power Traveling (Bridge) Cranes. Note condition of footwalk, railing, ladders and safety appliances.

H—Elevators and Other Hoisting Equipment. Note condition of signal system, cables, safety devices, gates, car and shaftway protection, car and landing lighting.

I—Transmission Equipment. Are oiling platforms,

* See "Effective Safety Work," THE PAPER INDUSTRY, January, 1922.

** The writer acknowledges his indebtedness to the Aetna Life Insurance Company for permission to use this Inspection Report and a few pointers on Safety mentioned under the caption Safety Devices from their safety literature.

ladders, belts, etc., in accordance with industrial safety standards?

J—Machine Hazard: (a) State what guards are found not in use and where guards should be provided. This should include all gears, pulleys, shafting, etc. (b) Note conditions of hoods and safety flanges. (c) Are there any points of operation on these machines where the hazard could be eliminated?

K—General Conditions: (a) Is the first aid equipment kept in proper place? (b) Is there proper light throughout the plant? (c) Are goggles, respirators and congress type shoes required? (d) Is material piled or stored in safe manner, etc.?

L—(1) Number of new recommendations. (2) Number of new recommendations submitted to date. (3) Number of recommendations carried out. (4) Number of incompleted recommendations outstanding.

M—Nature of accidents since last inspection and steps taken to prevent recurrence.

N—For use of General or Workmen's Committee Only. Suggested Improvements: (1) Plant layout with reference to routine of work; spacing and guarding of machinery. (2) Also note observance of safety measures and use of safety appliances.

This somewhat modified and abbreviated form has, of course, sufficient space between the individual captions for the entry of inspection results and recommendations. About three inches of the right-hand margin of the sheet is reserved for the general or workmen's committee use exclusively. The completed report is to be kept on file at the plant.

Safety Education

Safety devices and inspections will lose very much of their effectiveness if the third principal fundamental of the safety movement, Safety Education, is not given appropriate thought and attention. Safety education means to spread the Safety First Idea throughout the plant and make each employee an ardent follower and believer. Men must be made to understand that prevention of accidents is better than compensation.

Many accidents are attributable to carelessness and the "take-a-chance" attitude. The careless employee is bound to get injured, regardless of the fact that he is protected by every possible safeguard. The man with the safety first idea is more careful and will refrain from taking chances. He is the man who adds so much to the morale and discipline in the mill and maintains high production and standard efficiency.

Management, superintendents and foremen are those responsible for safety education. Bulletins and committees alone will not accomplish gratifying results if individual instructions and personal touch with employees are missing.

However, first of all the men who are responsible for safety in the plant themselves must understand the fundamentals of safety and believe in the work. Especially superintendents and foremen, who are in constant contact with employees, must see to it that all safety devices are installed and kept where they belong. They are responsible for the execution of recommendations made by the inspectors and committee.

A new man must be instructed as to the hazard of his job, and dangerous places should be pointed out to him. A timely word of advice may prevent an accident, and a helpful word from the foreman and new associates may turn the new man into a loyal, efficient employee and friend. At any rate, it will make him feel "at home" and that he is regarded as more than a mere small cog in the wheel.

Injuries must be taken care of at once, even if it is only a slight scratch, which may look too small to bother about, but frequently will become infected and serious trouble may arise.

The management should prominently display bulletins and safety posters in the plant, distribute safety literature and hold departmental meetings regularly. Employees appreciate efforts to make their work safer, and will in turn be more careful and attach greater importance to the safety idea. They will follow the safety rules and keep up the work as long as their superiors show that they themselves are interested in these matters.

Most industrial accidents are preventable and ninety per cent of the remainder can be eliminated if men are educated in safety work and the work is kept up.

No Substitute for Business Ability

SOME men have looked upon the various developments of scientific management as substitutes for old fashioned business ability, shrewdness and the trading instinct. They constitute a large part of those who claim that scientific management is a failure.

Thirty years or so ago, no one expected to succeed in business unless he was a good trader. Then along came the developments of cost accounting, production planning, time study and wage incentives. Executives began to use reports and charts. Some grasped at these new methods with an almost childish belief that they would solve all business troubles, and that systems would take the place of judgment, and make every man equally successful in business. Of course it couldn't be done. The man of natural business capacity who adopted the new methods, increased his lead. But he used systems as helps. A cost system will show the way to greater profits, a production planning system will reduce costs; but they will only do these things when they are used by an otherwise capable man.—W. R. Bassett.

Power Plant Management

Efficient Combustion Practice—Cutting Down Losses Through Draft Control

By ROBERT JUNE, M. E.

This is the third in a new series of articles by Robert June, the well known authority on Power Plant Management. The articles are written from the point of view of managing executive and deal with the dollars and cents end of Power Plant Operation and Maintenance. Succeeding articles deal with such live topics as Safe and Efficient Boiler Operation, Stoker Operation and Maintenance, What Management Should Know About Coal and Ash Handling Equipment, Steam Piping, Efficient Turbine Operation, etc. The series is timely and should prove of value to our readers.

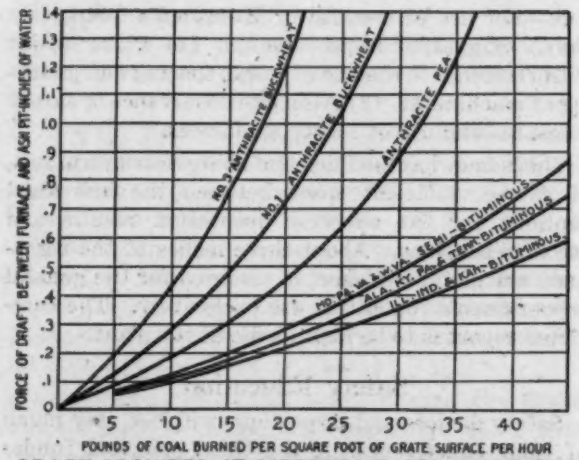
IN MAINTAINING combustion efficiency there are few factors more important than draft regulation. Without draft there would be no combustion. With too little draft huge operaing losses occur. With too much draft the losses are equally large.

Draft Required for Different Fuels

For each individual furnace there is a variable draft loss, which is affected by a number of factors. The air necessary for combustion must pass through the grate and through the fuel bed. With large openings and short passages such as occur when large uniform lumps of coal are thinly spread on a grate, the draft loss is extremely small. With fine coal, or coal of variable sizes which packs well, and with deep fuel beds the resistance to the passage of the air is very much greater. Should we attempt to supply the same amount of draft for both fuel beds, we would have with the thin fuel bed and the large lumps a condition where the coal would be rapidly burned on certain sections of the grate, leaving the fire thin at these points and as a matter of fact uncovering the grates, so that there would be very large losses due to the excessive amounts of air. With the thick fuel bed offering considerable resistance to the passage of the draft, due both to its thickness and more compact nature, we should have incomplete combustion, with low CO_2, high CO and large volumes of dense smoke pouring from the stack.

Thus we find that for every kind and grade of coal, for every furnace, and for different rates of combustion in the same furnaces, there is a certain draft from which most economical and satisfactory results are secured. Figure 1 gives a good general idea of the draft required to burn a number of the most commonly used steam coals at various rates of combustion. These are not absolute figures but simply indicate common experience. It will be seen that with the free burning bituminous coals a comparative light draft is most economical. The amount of draft required increases as the fixed carbon increases and the volatile decreases. The highest drafts are thus commonly required for small sizes of anthracite. It should be understood of course that not only the composition of the coal but the percentage of ash has a bearing on the draft required.

To sum up: there is one best draft for each boiler with a given fuel and a given rate of combustion.



DRAFT REQUIRED AT DIFFERENT COMBUSTION RATES FOR VARIOUS KINDS OF COAL

Figure 1

This best draft can be readily determined by experiment.

Draft Gauges Essential

If you are going to operate at a draft best suited to your fuel and your rate of combustion, you must know when you have secured that draft and whether you are maintaining it. This means that the use of a draft gauge is essential.

Let us suppose that your boilers are equipped with draft gauges. Unless the firemen are making use of the information furnished them, you will be surprised at the variety of drafts which you have in your plant as you go from boiler to boiler. The trouble is this, the firemen know that draft is a good thing and their inclination is to make good use of it.

It is a universal custom in designing power

plants to provide for an excess of draft. Then to throttle this down dampers are furnished. Now the great trouble is if the firemen either leave the damper wide open, or else open entirely too wide for the purpose in hand. This is on the assumption that you do not have automatic damper control, of which more later. The point here is that the draft gauge tells the story and the damper controls it.

Suppose you have a hand-fired plant, and the firemen do not adjust the dampers to the load. What then is their procedure? The answer is that they use the ash pit door for this purpose, and that this is a most expensive procedure. Close the ash pit doors and you will note that the vacuum on your draft gauge is greatly increased. The result of this is to speed up the inflow of air at all of the cracks, crevices and holes in the boiler setting. Flue gas temperature is reduced and steam production is checked but the process is a wasteful one. The answer is—if nothing better can be done at least see to it that manual damper control from the front of the boiler, so arranged that the fireman can get at it as easily as he does the ash pit doors, is provided. Then compel the fireman to use the dampers in preference to the ash pit doors.

Now getting back to the draft gauge. You are buying this for the fireman, and he is the man to keep in mind. If the gauge tells him what he wants to know and in a way which he can understand and at the moment when he needs the information he will use it—not otherwise. Here are the points to keep in mind.

1. Provide a draft gauge for each boiler furnace.

2. Locate gauges at the most convenient and accessible point. Put them at the front of the boiler at a convenient height so that the fireman does not have to step out of his way a foot to read them.

3. See that the scales are large and easily read. If necessary provide an electric light for the gauge. An unlighted gauge is not much good in a dark boiler room.

Figure 2 shows a typical draft gauge with a range of 74 hundredths of an inch of water.

Automatic Control

Automatic control as applied to forced draft involves the consideration of three factors; the provision of air supply introduced beneath the fuel bed, the feeding of the fuel, and the draft over the fire. To govern these factors so that they may be utilized to the best advantage we must control the apparatus which supplies the forced draft under the fire, we must control the rate at which the stoker feeds the fuel, and we must control the damper or it may be the induced draft fan in the boiler breeching, which controls draft over the fire.

Now, first and last a good many different types of equipment have been developed for the purpose of securing automatic control. Speaking in a general sense this equipment as a class has given effective service and has effected worthwhile economies which have made it a good investment in the plants where it has been installed. Specifically, however, combustion control equipment has not always been designed and is not today always designed, on lines which will effect the greatest economies.

A straight line is the shortest distance between two points. This being the case if you want to maintain an even steam pressure the most effective means of accomplishing this result is to have the steam pressure directly control the forced draft fan.

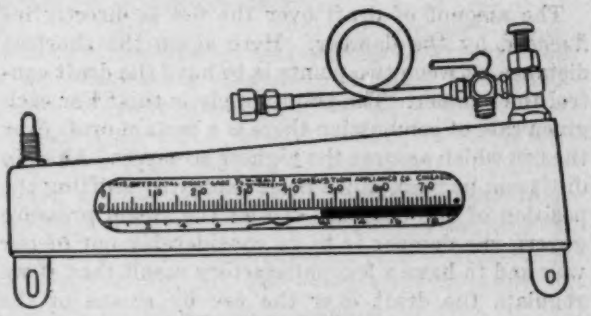


Fig. 2—Draft Gauge

This is the direct straight line and it is a better arrangement than to have the steam pressure control the damper and then let the draft over the fire in turn control the forced draft fan. In following out this principle of reasoning we arrive at once at the proposition that two or more sources of control may perhaps be better than one. Here we run counter to some exponents of a single source of control. Let us examine the situation as impartially as possible.

Control of Forced Draft

Our forced draft fan is operated by an engine or motor, so that we can govern it through the medium of regulation on the steam lines to the engine, or in the electric circuit of the motor. We have the choice also of letting the governing factor be the amount of fuel supplied, the draft over the fire, or the steam pressure. Now, if you want to raise steam pressure in a hurry, the one reliable and immediate method is to increase the draft. Setting about the matter in any other way simply complicates the situation and increases the length of time it takes to produce the desired results. Falling steam pressure is instantly compensated for by an increased draft.

Granted that this form of control is adopted, you have to decide on some modification of it when more than one boiler takes air from a fan. The modification sometimes used is that of arranging to govern the butter-fly gates and the air ducts leading to individual boilers by the rate of combustion in each boiler. This does not work well in practice, since the greater the amount of combustion in an individual

boiler, the greater the air supply and therefore still greater increase in combustion. In other words, a condition is created whereby one boiler tends to pull the load away from another.

Therefore the proper way to handle the butter-fly gates is to determine best average point at which equable distribution of the load can be obtained and then to set the butter-fly gates permanently in this position. This method eliminates see-sawing, as each boiler will take its share of the plant load at all times without any tendency towards "hunting."

Control of Draft Over the Fire

The amount of draft over the fire is directly influenced by the damper. Here again the shortest distance between two points is to have the draft control the damper. The point simply is this: For each given rate of combustion there is a certain draft over the fire which assures the highest economy. An even draft can be maintained most readily by shifting the position of the damper. To let the steam pressure govern the damper is to go considerably out of our way and to have a less satisfactory result than if we regulate the draft over the fire by means of the damper. To make this still clearer, suppose we open the damper by a change in steam pressure. We then find that the damper must be open an appreciable length of time before the forced draft fan has increased the amount of gases to a volume corresponding to the opening. In the meantime the economy of combustion has been adversely affected. We need to separate very clearly in our mind these two propositions.

Proposition 1. The maintenance of steady, even steam pressure is of value only in its relation to load conditions. Governing the forced draft fan from the steam pressure is the most direct method of maintaining uniform load requirements. While highly desirable and frequently absolutely necessary, it is not primarily a means of effecting economies. The saving may range from 2 to 5 per cent of fuel.

Proposition 2. Damper regulation controlled by draft over the fire is one outstanding means of effecting marked economies in combustion. Here the savings in fuel may range from 5 to 15 per cent.

Damper regulation from the draft over the fire is therefore recommended for all plants. Where there are a number of boilers in a plant, direct control of each damper from the draft over the fire in the boiler to which it is attached is a very much better proposition than to attempt to move all dampers simultaneously without regard to the conditions obtaining in the individual boiler.

Control of Feed of Fuel

With mechanical stokers the feed of fuel to the furnace may be arranged to give constant steam pressure, constant draft over the fire, or it may be made to increase or decrease with the load on the boilers. The latter method is, of course, theoretically the best. If you could vary the amount of coal just as the load varied you would have an ideal condition. Unfortunately, combustion equipment manufacturers have not yet as a class been able to solve the problem of devising a simple, efficient and dependable control of fuel feed from the steam flow. The problem is being attacked, however, and it seems reasonable to suppose that it will eventually be solved. When it is, it will be possible to have absolutely direct control of each factor in our combustion trio; that is, we will control the air supply from the steam pressure, the damper from the draft over the fire, and the fuel feed from the steam flow.

For the present we must content ourselves with indirect control of the fuel feed. Here we have our choice of controlling the fuel feed from the draft over the fire or from the steam pressure. Utilizing the draft over the fire for this purpose is not a satisfactory arrangement for a number of reasons. One of them is that the control must be extremely sensitive, as we have a variable ranging from 0.05 to 0.15 inches of water to control a stoker, which determines the output of the boiler.

This brings us back, then, to the control of fuel feed from the steam pressure, or if preferred from the forced draft fan. Either arrangement is satisfactory and possesses the advantage that increases or decreases in the supply of coal directly corresponding with increases or decreases in the air supply. Stoker control systems designed along these lines are rendering satisfactory service in literally thousands of plants. There is no reason why they should not be unhesitatingly adopted by any power plant operator.

How Regulation Apparatus Should Be Built

Here are points to remember in purchasing boiler-room apparatus, particularly controlling devices:

1. The apparatus should be as simple and elementary as possible, telling the boiler-room crews exactly what they need to know and no more. All readings should be direct, so that calculations are unnecessary. Simple design is of utmost importance, as boiler-room men are not usually finished mechanics.

2. Strength is just as desirable as simplicity. Boiler-room apparatus is subject to a good many hazards, and unless it can successfully withstand bumps and knocks it is of little value. Moreover, the apparatus must be able to operate accurately when covered with dust and grease.

3. The apparatus should be so designed that it can be installed by the operating engineer in charge of the plant without having to go to the expense of an erecting engineer from the manufacturer's factory. Erecting engineers are highly desirable on larger

equipment such as soot blowers and stokers, but their expense is almost prohibitive with boiler-room instruments and control devices.

4. Directions for cleaning and repairing the apparatus should be so clear that the operating engineer can understand them readily and can make the necessary repairs when required.

5. Control apparatus should be sensitive enough to maintain desired combustion conditions without hunting, racing, see-sawing or lag.

Contribution to the Study of Paper Drying

R. ISNARD

Translated from Le Papier xxvi, 217-224, 1923, by A. Papineau-Couture

COMPETITION is the life of industry, and, if, in most branches of its activities, it presents itself under forms as numerous as they are varied, there are few where it is more clear cut and more bitter than in paper making, and especially in board making.

It is true that the paper maker occasionally has a chance to cut down his costs by judicious buying of his raw materials, at times by means of exceptional chances and especially by paying only for value received as shown by analysis. He may also have occasionally, but much more seldom, a chance to sell his product at a better price than he had anticipated. But he should above all and at all times endeavor to increase his profits by reducing his manufacturing costs. In this respect he has free play, and he can try to improve his manufacturing processes, reduce labor costs, cut down fuel consumption, etc.

In this article we shall confine our attention to this latter point, and more particularly to economies which can be effected in drying.

1—Losses at the Dryers

The calorific efficiency of a battery of dryers is the ratio of the amount of heat theoretically required to dry a given quantity of paper to the amount of heat which passes through the dryers (in the form of latent heat) while this quantity of paper is being dried. Is this efficiency satisfactory in most of our machine rooms? Though in most cases it is absolutely unknown, or even not thought of, in spite of its very great importance, it can be truthfully said that in nearly every case it is very poor.

Example—Consider a machine turning out 18 tons of board per 24 hours and equipped with 24 dryers each 1.30 meters in diameter and 1.85 meters long. We will assume that two-thirds of the circumference of the dryers is in contact with the paper, the remaining third and the ends being bare.

We must first determine the amount of heat required to dry 1 kilo of board. The sheet enters the dryers with about 60 per cent of water, so that 1.5 kilos of water must be evaporated for every kilo of board produced. The sheet is raised from 15°C. to an average temperature of 60°C., so that we require $1.5 \times 45 = 67.5$ calories to heat the water and $1.5 \times 565 = 852.5$ calories to evaporate it, making a total of $67.5 + 852.5 = 920$ calories. Assuming that the specific heat of the board is 0.4, the heating of the board requires only $0.4 \times 45 = 18$ calories.

Hence, theoretically 938 calories are required to dry 1 kilo of board.

Assuming that an evaporation of 7 to 8 kilos can be obtained with a good grade of coal, and taking a yield of 600 calories per kilo of steam to allow for losses from the boiler to the dryers, the latter should take $\frac{938}{600} = 1.56$ kilos of steam, equivalent to 200 grams of coal per kilo of board.

Results obtained in practice are generally very far from this. Is the heat supplied over and above this amount a net loss? Just about, for if it has "worked" in the machine room, as we shall see further on, most of it none the less goes out through the monitors. Part of the heat is used to warm up the felts which are periodically cooled; part is absorbed by the condensate; while the major portion is lost through radiation and convection. We shall examine these losses in turn.

Losses from the Felt

When the felt presses the web against the dryer, the latter transmits by conduction an amount of heat which can be approximately calculated. If T and t are the temperatures of the two sides of the sheet, S the area of the dryers in contact with the paper, P the output per hour of the machine, and e the thickness of the sheet, the heat per kilo of board, in calories, transmitted through the sheet is

$$Q = KS\frac{T - t}{Pe}$$

in which K is the conductivity coefficient of the wet

sheet, which has never been determined to our knowledge.

Referring again to the machine mentioned above, which turns out per hour 750 kilos of board 1 mm. thick, we see that the area of contact of the dryers is

$S' = \frac{2}{3}\pi \times 1.30 \times 24 = 120.48$ square meters

The difference in temperature between the two sides of the sheet, T— t, is about 35°C.; so that substituting in the above formula we get:

$$Q = K \times 120.48 \frac{35}{0.001 \times 750} = 5{,}622K$$

Now, even if we take for K the value found for dry paper, namely, 0.035, we see that $Q = 5{,}622 \times 0.035 = 197$ calories. Comparing this value of 0.035 with the corresponding value for water, which is 0.5, it is readily seen that Q increases very considerably and rapidly from the winder to the wet end of the dryers.

Now, this heat is not, strictly speaking, completely lost; for as soon as the felt leaves the last dryer it cools down by giving up some of its heat to the surrounding atmosphere, and we have a particular case of the more general losses by convection and radiation, to which we shall now turn our attention.

But on the other hand felts are the cause of another loss of heat which we shall consider a little further on.

Losses from Radiation and Convection

According to the formulas of DuLong and Petit and of Péclet, the amount of heat transferred by radiation by a surface of area S in Z hours when the body is at T° and the surrounding medium at t° is given by $R = 125\,S\,Z\,(1.0077^T - 1.0077^t)r$

The uncovered portion of the dryers has an area $S'' = \frac{1}{3}\pi \times 1.30 \times 1.85 + 2\pi \times 0.65^2 \times 24 = 123.84$ square meters.

Taking the temperatures of the dryers, felt, and atmosphere as 120°, 60° and 15°C., respectively, and substituting in the above formula, we find that the loss for the free surface is

$R'' = 125 \times 123.84 \times 24(1.0077^{120} - 1.0077^{15})3.3 = 1{,}752{,}500$ cal., and for the area of contact it is

$R' = 125 \times 120.48 \times 24(1.0077^{60} - 1.0077^{15})\ 3.6 = 650{,}500$ calories (3.6 is the generally accepted value of r for wool); so that the total loss is 1,752,500 + 650,500 = 2,403,000 calories, and the loss per kilo of board is 2,403,000/18,000 = 133 calories.

The convection losses are even greater, but it is practically impossible to determine them with any degree of accuracy because the formulae of DuLong and Petit and of Péclet

$$C = 0.552\,S\,f\,Z\,(T - t)^{1.233}$$

are applicable only provided the fluid under consideration is at a constant temperature t. Such is not the case in this instance, for not only are the upper dryers at a higher temperature than the lower ones, but also the arrangement of the dryers affects the value of t. It should also be noted that the temperature of the atmosphere varies on account of the radiation from the dryers, being 60° to 70° in the immediate neighborhood and falling to 30° to 35°C. at a distance of only 20 centimeters.

Proof of this irregularity can be found in looking at the vapors rising from the machine, which seem to be formed at a certain distance from the sheet.

Moreover, the coefficient f in the above formula is known only in the case of natural convection, that is, when the displacement of air is due entirely to the heat from the hot body. In this respect, again, we have nothing definite or accurate to go by; for if, on the one hand, the web, felts, dryers and frame interfere with the upwards circulation of the air, and thus tends to decrease the losses by convection, on the other hand exterior causes such as sudden inrushes of air through open doors or windows, draughts, etc., increase the losses, and it is practically impossible to ascertain their exact value.

We can, however, get some idea of the losses.

Suppose we have a bare horizontal dryer 1.30 meters in diameter and 1.85 meters long at 120° C. in a still atmosphere at 15°C. The total area will be 10.18 square meters. According to Péclet, in this case f = 2.117, and the convection loss for 24 hours would be: $C = 0.552 \times 2.117 \times 10.18 \times 24(120 - 15)^{1.233} = 89{,}000$ cal., approximately. Suppose the whole battery of dryers was placed under the same conditions: then the loss per hour would also be 89,000 calories and the loss per kilo of board produced would be 89,000/750 = about 120 calories.

This loss would not be exorbitant by any means; but various outside causes come into play and modify it to such an extent that it becomes extremely difficult, if not impossible, to determine it, even theoretically. For instance, the coefficient of heat transmission f increases proportionately to the square root of the volume of air passing through in unit time. In the example which we have chosen if the board enters the dryers at 45 per cent dryness, the amount of water to be evaporated per hour will be $(750 \times 55)/45 = 916.6$ kilos. The quantity of dry air necessary to remove this amount of water is essentially variable, for the "solubility of water in air" increases very rapidly with the temperature of the latter. Each kilo of water requires

at 20°—71.500 kilos of air
at 50°—11.600 kilos of air
at 80°— 1.800 kilos of air

In other words, the amount of dry air required to remove the 916.6 kilos of water will increase as its

temperature decreases. This will increase C in two ways:

(1) by increasing f

(2) by increasing T—t

Losses by Condensation

We finally come to another very important loss of heat, namely, condensation in the felts.

All the vapor liberated from the web as it travels over the dryers must necessarily pass through the felt, which, from its very nature, is more or less permeable to steam. Woolen felts possess a medium permeability, while that of cotton felts is very low owing to their closer texture.

As it passes from one dryer to the next, and especially from the last to the first, the felt gives up part of its heat to the surrounding atmosphere which is at a lower temperature. In coming in contact with the first dryer it must therefore regain the heat lost. Also, on leaving the last dryer the felt is absolutely saturated with steam, which condenses when the felt cools and a considerable amount of heat is required to re-evaporate it.

We have tried to ascertain the order of magnitude of this condensation by saturating a machine felt by running it without a felt dryer on a battery of four small dryers 0.80 meter in diameter. The temperature of the felt as it left the last dryer was 70°C. A portion of the felt was then very rapidly cut off and placed in a cold atmosphere to condense practically all of the vapor in the felt. The felt was then dried, and the following observations were made:

Area of the felt.....	0.334 square meter
Wet weight	1.030 kilos
Dry weight	0.650 kilo
Weight of water.....	0.380 kilo

that is, the felt contained 37 per cent of water. The enormous quantities of water thus carried by the felt are readily seen. It should be noted, however, that this felt was pretty well worn out, as shown by the fact that it weighed only 1.950 kilos per square meter, so that we shall base our further calculation on the weight of water per square meter, which is $(0.380 \times 1{,}000)/0.334 = 140$ grams, instead of on the percentage weight. In the case of our machine, if the board weighs 500 grams per square meter, it will weigh 500×1.85 grams per running meter, while the felt on reaching the first dryer contains $1{,}140 \times 1.85 = 2{,}110$ grams per running meter, or an average for the whole length of the felt of 1,055 grams of water, of which we shall consider that 500 grams are actually condensed. Calculating this per kilo of board we get $(500 \times 1{,}000)/925 =$ grams of water, which require about 320 calories to evaporate.

Of course we admit that the felt dryer will help to prevent condensation by eliminating some of the water vapor, and will prevent excessive cooling of the felt, and the felt still contains some water vapor when it reaches the first dryer; but nevertheless the principle stands. Either the felt is dried thoroughly and requires all the heat which we have calculated, or else it keeps part of its water (which is generally the case) and its permeability to steam is considerably decreased.

And moreover, too much faith should not be pinned in felt dryers. They are installed for a very good purpose; but when the machine is speeded up their efficiency is very doubtful. Taking our same machine it is not difficult to calculate that a production of 750 kilos per hour of board weighing 500 grams per square meter requires a speed of 13.50 meters a minute. In passing over a felt dryer 1 meter in diameter (since it is customary to make felt dryers smaller than the regular dryers) in contact with two-thirds of the surface, the felt remains in contact with the metal about 9 seconds, just long enough to warm the surface of the felt; whereas $13.50 \times 0.500 = 6.750$ kilos of water should be evaporated per minute. Evidently this would require more than a small dryer!

Losses at the Steam Traps

These are unfortunately often accepted as "inevitable." Under pretext that the trap does not work fast enough the needle is very frequently displaced from its normal position, and in order to make sure that all the condensate is being removed a small jet of steam is allowed to issue continually. Naturally this steam is lost, as is also a considerable amount of heat carried away by the water which is at a temperature very near the boiling point.

Conclusion

From what precedes it is evident that the latent heat of the steam is not all used in drying the paper. The sources of loss are numerous and a close study of their various effects is extremely complicated and difficult. Some of them compensate each other; others act in the same direction; but the net result is always on the debit side of the balance sheet.

It should be noted, however, that if certain of the losses, such as the loss of steam at the traps, are irremediable, others, and fortunately they are the most important, have a direct bearing on the production, for directly or indirectly they cause the surrounding air to be heated and facilitate the removal of the water vapor.

2—Methods of Prevention

This brings us to the other side of the question, namely, how can this state of affairs be prevented, or at least improved?

It has been suggested that the dryer felts be eliminated and that the drying cylinders be replaced by flat heated plates thoroughly insulated on one face; but then, how will the paper be made to lie flat if it is not pressed tightly against the drying surface.

In order to overcome the drawbacks inherent to the use of dryer felts, especially in board making, it

is preferable, by far, to replace them by wire cloths, as is actually done in a number of mills. This has the two-fold advantage of giving a much greater permeability than with the felts and of completely eliminating condensation in the fabric. The only drawback is that it is not very practical at the end of the dryer section because it makes the sheet "sag."

It has also been suggested that every second or third dryer be replaced by an "aerator," which is nothing but a suitable set of blades having the same axis as the dryer removed, and around which the sheet would pass in the same way as if the dryer were still there. In principle this is excellent; but it has not been successful in practice because the only result was to stir up an already partly saturated atmosphere.

There are a hundred and one different kinds of traps which have been recommended, and it might be worth while for paper mills to try more than one so as to have some idea of the best one, even though it may entail a certain expenditure. The tendency at present is to equip each dryer with an individual trap. A moment's thought will show that this means multiplying the number of leaks by 10, 20, or even 30, in the case of large batteries of dryers; so that it is more economical in the long run to get traps of ample capacity and to adjust them as they are meant to be.

Another suggestion has been that the heat passing through the paper machine roof in the form of hot moist air be recovered in the same manner as the heat of blast furnace gases is recovered, namely, by passing them through masonry which is then used to heat up the air blown into the furnace at the tuyères. This is a step in the right direction; for, as we have seen, most of the heat supplied to the machine finally passes out through the monitors. But even this method is far from perfect: as the heat is removed through the roof the economizer is expensive to install; it must be built of material which is not attacked by water vapor nor by acid fumes which may be present around the mill; as it handles gases at a temperature which rarely exceeds 40° to 45°C., the heat transmission is slow and difficult owing to the slight difference in temperature between the incoming and out-going air, so that the velocity of the air to be heated must be very low and the area of contact very large. Tests along this line have been carried out in other countries; but success has been limited, especially during warm weather. (For figures as to the actual performance of Briner economizers under working conditions see J. O. Ross's article on "Heat Recovery from Machine Room Vapor" in Pulp and Paper Magazine xxi, 667-670, July 5, 1923. Translator.)

Finally, heat is lost elsewhere than through the monitors. A considerable amount is required for heating the machine room, and if we stop to consider that the coefficient of loss of heat through glass is twice that through a 12-inch brick wall, it is readily seen that the large glass areas of modern machine rooms are as expensive as they are useful.

Drying of paper and board is obtained by "dissolving" the water in the sheet in the surrounding atmosphere. The factors affecting this "solution" are: 1—Nature of the solvent; 2—Temperature of the solvent; 3—Proportion of solvent, i. e., the dilution; 4—Degree of saturation of the solvent.

The first factor is constant in this case, and we need not take it into consideration.

With respect to the second factor it is necessary to make a certain point clear: if the body to be dissolved is present in very large quantities, and such is the case in the present instance, not only should the temperature of the air be taken into consideration, but also that of the substance which it is to take up and which will part with its excess heat. Hence, in order to obtain a satisfactory removal of the moisture it is necessary to heat both the sheet and the air. This is not what is generally done in practice, but it is nevertheless the principle which should be followed; not only should the sheet be heated, but also the air.

The third factor practically entails a thorough ventilation; not merely some sort of makeshift system to remove the fog and vapor from the machine room, but a well-designed and efficient system which will continually remove the air which is confined between the drying cylinders, the sheet and the felts, which removes the water vapor as rapidly as it is formed, thereby ensuring an intensive production of vapor.

The fourth factor is the most neglected of all, and yet it is of very great importance. What would be the use of sending to the dryers to saturate it with moisture, at a higher temperature, of course, air which is already saturated at atmospheric temperature during wet weather? And yet this is what is happening daily in many paper mills: air from the outside, saturated with moisture, comes in contact with the dryers, and more particularly with the ends (which thus become extremely useful!), is thereby heated, and thanks to this purely accidental heating can then carry off some of the moisture driven out of the sheet by the heat of the dryers.

The conclusion is not hard to draw. In order to dry the sheet rationally and economically with a given battery of dryers:

1—Air should be taken from outside, and in summer its moisture content should be reduced as far as possible during the daytime either by cooling or by any suitable and economical mechancial or chemical process;

2—It should then be heated up so as to give it as high a water carrying capacity as possible;

3—Finally, it should be blown directly into the

dryer section of the paper machine, distributing it so as to avoid unevenness in the drying.

Cooling the Air

Each mill must settle for itself how best it can secure air as cool as possible. No two mills have the same layout and hence no general rule can be formulated. Paradoxical though it may seem, the wet end of the machine, near the screens, may be a suitable point at which to take the air.

In winter and at night this need not be considered, the air outside being generally sufficiently cool.

Heating the Air

In most mills there is a supply of lost heat much greater and more easily recovered than what is going through the paper machine room roof. It is the flue gases from the boilers.

A very simple calculation will soon show the magnitude of this loss. In order to obtain proper combustion of coal with transformation of the whole of the carbon to carbon dioxide there are theoretically required about 9 cubic meters of air; but in practice nearly double this amount is used, generally about 16 to 17 cubic meters. These 16 cubic meters weigh $1.300 \times 16 = 21$ kilos (approximately); and on adding the weight of the coal (carbon and total volatile constituents) we have about 22 kilos of gases. In order to have proper draught these gases must be at a temperature of about 250° to 300°C. The specific heats of air and carbon dioxide under constant pressure at this temperature are practically equal to 0.25, so that the heat carried off by the gases is given by

$Q = 22 \times 0.24 \times 250$ to $300 = 1{,}300$ to $1{,}600$ calories per kilo of coal.

Now, if we assume an average consumption of 1 kilo of coal for drying 1 kilo of paper or board (which is about an average value for many mills) we find this rather astounding state of affairs, that for every 938 calories theoretically required at the dryers 1,500 calories are lost up the chimney.

We do not wish to appear too drastic by recommending drying by means of hot air; though this is quite conceivable and theoretically practical, still it presents certain serious difficulties, of which the specific heat of air is not the least. But we think that in many cases it would be economical to use the flue gases to warm up the air. It would not be difficult to carry out in practice, especially if there is plenty of room around the boilers. It would be necessary to merely draw the flue gases through a heat exchanger consisting of series of passages of plane or corrugated sheet metal before sending them to the chimney. A tube exchanger would not be as satisfactory, though it has a greater heat exchanging surface. The installation of such a piece of apparatus in a new mill would hardly cost any more than the erection of a large brick chimney such as would be required for natural draught.

Blowing the Warm Air

The air thus heated must be judiciously used. It will be necessary to send more air to the part near the wet end than to the part near the winder. It should be distributed throughout the whole width of the machine, the amount being slightly increased from the sides towards the center because there is always a fairly good natural ventilation near the edges of the sheet. The air should not be directed directly against the sheet, but should rather be distributed between the dryers, for instance, by means of perforated pipes.

Finally, the hot air may be made to serve another very useful purpose. We have shown that the mere passing of the felt over the felt dryer is not sufficient to dry it, by any means. Why not, then, send the hot air through the felt? A thorough ventilation at a relatively high temperature will dry it very quickly. It is quite easy to design a "drying box," somewhat similar to the suction boxes, which would be of about the same length as the width of the machine so as to be always completely covered by the felt. It could be placed against the felt in between two felt rolls and would be used to blow the hot air through the felt. The fans would have to be a little more powerful, owing to the resistance of the felts to the passage of the air, but on the other hand the felts would always be dry and would last longer.

There is no great wizardry in this and boxes can readily be constructed either of wood or metal, cylindrical or rectangular, as best suits the arrangement of the felts and dryers.

In this case it would be necessary to keep the temperature a little lower than when using perforated pipes; but the volume of air could easily be regulated so as not to let the temperature rise above a given point.

By adopting these measures a given volume of air will carry off a much greater amount of moisture, the life of the felts will be increased, vapor and drip will disappear from the machine room, and the paper will dry more rapidly without having any tendency to curl or wrinkle.

"Framing" vs. "Analyzing" a Job

Two confusing terms often used in industrial management are "framing" a job and "analyzing" a job.

Framing means putting together a job by sketching out the plan or program of it for a worker in order that he will know what changes are to be made by the various operations and tools.

Analyzing means the tearing apart of a specified job for the purpose of deciding what operations are necessary and arriving at definite information upon which to base investigations, experiments, instructions and schedules for gaining the maximum production.—LaSalle Extension University.

Pointers for the Engineer

Oil or Coal for the Paper Mill?

By W. F. SCHAPHORST, M. E.

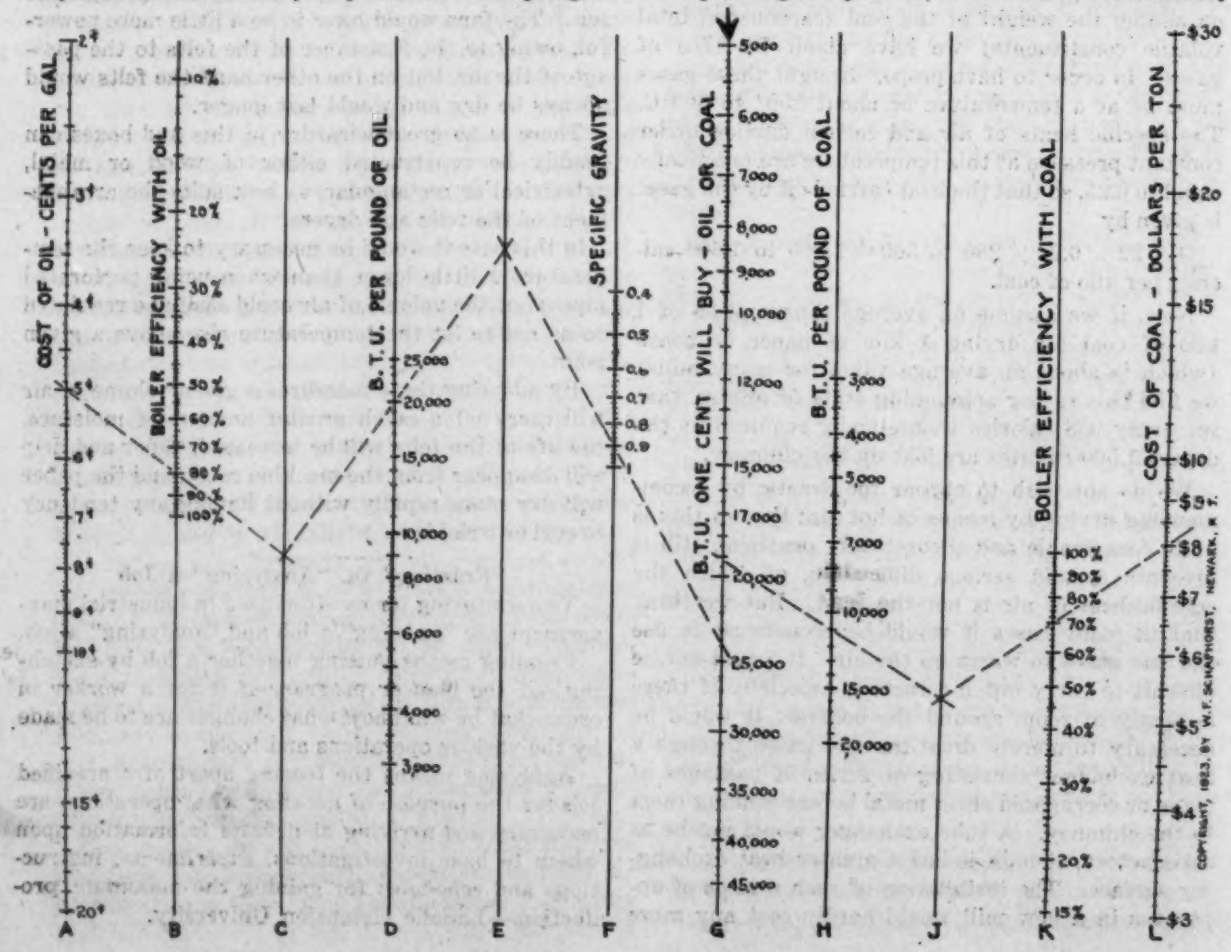
PERHAPS the most up-to-date question for the paper mill power plant engineer to answer is: Will it pay us to burn oil instead of coal under our boilers?

The writer will not attempt a direct answer to that question because it is a hard one to answer. Much depends upon conditions. Oil is being burned under many boilers already and its use appears to be satisfactory. Some of our best engineers are opposed to the use of oil and other engineers equally prominent in the profession are in favor of oil burning. For example, Government engineers in Washington, D. C., recently decided against burning oil in the Federal buildings because they are in favor of conserving oil for the "next war." Also, they pointed out that vast savings can be effected even with coal as a fuel by properly burning the coal, which is doubtless true. And then on the other hand we read just the other day that the U. S. Navy Department is adopting oil for use in its stationary power plants in place of coal.

Nevertheless, the oil vs. coal question is a live one and should be thoughtfully considered for every paper mill plant that has difficulty in obtaining coal and where a high price must be paid for coal. This simple and handy chart, prepared by the writer, will assist in deciding that question.

To use the chart it is merely necessary to zigzag across, as indicated by the dotted lines, and column G, which is pointed at the arrow at the top, tells the number of B.t.u.'s there are to each cent's worth of coal or oil purchased. That is, the same column, column G, applies to both oil and coal.

In figuring the oil, begin at the left and zigzag toward the right to column G. In figuring coal, begin at the right and zigzag toward the left to column G. If the oil, for instance, contains 20,000 B.t.u.'s and the specific gravity is 0.9, and if the boiler efficiency



with oil fuel is 80 per cent, the zigzag dotted line drawn across the chart from column A to column G through these respective figures shows that each cent will buy 24,000 B.t.u.'s.

Begin at the 5c, column A, and run through the 80 per cent, column B, with a straight line. This locates the intersection with column C. From this intersection run through the 20,000 in column D, thus locating the intersection in column E. From this last intersection go through the 0.9, column F, and the final intersection with column G then gives us the answer—24,000 B.t.u. for each cent.

Coal costs $8.00 per ton of 2,000 lbs. and if the boiler efficiency using the same boiler as above is 70 per cent with coal and if each pound of coal contains 11,000 B.T.U.'s each cent will buy about 19,200 B.T.U.'s as shown in column G.

As will be noted, the $8.00 is found in column L, and the 70 per cent boiler efficiency is in column K. Run a straight line through both points and locate the intersection in column J. Then from the located intersection in column J run a straight line through the 11,000 in column H and the intersection with column G gives us 19,200 B.t.u.'s.

In other words, the solution of this problem indicates that the use of this oil at 5c per gallon will furnish nearly 5,000 B.t.u.'s more for each cent than will coal at $8.00 per ton.

In using column A the cost per gallon should include all costs—cost of hauling, cost of storing, etc.

It is well known that boiler efficiencies with oil are usually greater than with coal. The difference often is as much as 10 per cent as in this problem where we use 80 per cent in column B and 70 per cent in column K.

Regarding specific gravity given in column F, an easy way in which to determine this is to take any vessel such as a pail, jug or bottle and weigh it. Then fill it with water and weigh again. Subtracting the weight of the vessel gives us the weight of the water. Now do the same with oil and the exact weight of an equal volume of oil is obtained. Now divide the weight of the oil by the weight of the water. The quotient is the specific gravity. The less delicate the scales used for weighing the greater should be the size of the vessel.

Where a sample of the oil is not available and where the density of the oil is given in degrees Baume, the following table will be found useful in connection with column F.

Degrees Baume	Specific Gravity
10	1.0
15	0.97
20	.93
25	.90
30	.88
35	.85
40	.82
45	.80
50	.78
55	.76
60	.74
65	.72
70	.70
75	.68
80	.67
85	.65
90	.64
95	.62
100	.61

To calculate the specific gravity, knowing the degrees Baume, simply add the degrees Baume to 130 and divide the sum into 140. The quotient is the specific gravity.

As for the cost of coal, column L, this is similar to column A and must include all costs such as hauling, storing, pulverizing, and if purchased some time ago the interest on the purchase price.

This chart may be used in several ways for solving various problems. Thus by zigzagging clear across from left to right from column A to column L, knowing the cost of oil and all the necessary intermediate factors, column gives the equivalent cost of coal. Or zigzagging toward the left from column L we get the equivalent cost of oil. Thus with coal at $6.00 per ton and the boiler efficiency at 70 per cent we would find that a heat value of 10,300 B. T. U.'s per pound of coal would give us no advantage in using oil as regards cost of oil. But oil has other advantages, such as greater simplicity, less labor required for firming, less storage space required, etc. All of these points, including particularly availability of supply, must be given consideration before one can decide that oil should be used in preference to coal or vice versa.

Philosophy

"De sunflower ain't de daisy, and de melon ain't de rose,
Why is dey all so crazy to be sumfin else dat grows,
Jes' stick to de place yer planted and do de bes' yo' knows,
Be de sunflower er de daisy, de melon er de rose.
Don' be whut yer ain't, jes yo' be whut yo' is,
Ef yo' am not whut yer are, den' yo' is not whut yer is,
Ef yo' is jess a little tadpole, don' yer try ter be de frog,
Ef yo' is de tail, don' yer try ter wag de dawg.
Pass de plate ef yer can't exhawt en preach,
Ef yo' is jess er little pebble, don' yo' try ter be de beach,
When a man is whut he isn't den he isn't whut he is,
And 'ez sure 'ez I'm a talkin', he's a 'gwine ter get his."

Joint Fall Convention of T. A. P. P. I., Superintendents and Cost Accountants

FRIDAY and Saturday, October 26 and 27, 1923, were big days for the city of Appleton, Wis. More than 250 representatives of the pulp and paper industry from paper making districts throughout the East and Middle West assembled there to attend the Eighth fall Convention of the Technical Association of the Pulp and Paper industry, which was held jointly with the local division meetings of the Northwestern Superintendents and the Cost Association. A number of ladies also attended the convention and enjoyed the special program arranged for their entertainment. It was freely admitted by all that a better understanding between these working bodies was obtained from carrying out this idea of a joint meeting.

The success of the program was made possible through the courtesy and co-operation of the manufacturers of Appleton and great credit is due to the general committee on arrangements consisting of B. T. McBain, F. O. Boyce, J. H. Slater, W. A. Kelley, and V. P. Edwardes and to the local committee, consisting of Paul Smith, John Hersher, E. A. Peterson, R. E. Carncross, O. P. Schlafer and H. G. Corbett. One outstanding character in the two days' proceedings was Emmet J. Carey, of the Nekoosa-Edwards Paper Company, who aside from being the registrar and publicity manager was a bureau of information for all who sought it.

T. A. P. P. I. MEETING

The Convention opened on Friday morning, October 26, following the registration the day before, with a business meeting of the Technical Association in Elk's Hall. President Howard S. Taylor, of T. A. P. P. I., opened the proceedings with the following address:

"It is with great pleasure that I welcome you, assembled here at this, the Eighth Fall Convention of our Technical Association of the Pulp and Paper Industry. The fact that we are meeting in joint session with the Superintendents and Cost Associations is an event, I believe, to be remembered, as it indicates the desire of each Association for team work, and our getting together in this way can but benefit ourselves as well as those whom we serve.

"As I stand before you, I see many that have been my friends and associates since the inception of the Association, and I see many others who have but recently taken membership. This is typical, I believe, of our activities, and I would express the thought that I wish to convey by letting those of long standing be indicative of the excellent achievement that this Association has performed in the past, and they together with those of later standing represent the far greater service that is to be forthcoming, for to the technical man, the past is valued only for its contributions to the ever improving future.

"Improvement in the pulp and paper industry there has been during the past few years, but not to the extent, I believe, that the field offers. Methods in general bear little change, and the inefficient steam plant, prime movers, and processes are still with us. Waste in heat, stock, raw materials and finished product, although in the process of correction, still offer a broad field for our Waste Committee, and extensive opportunities for future advancement in heat, light and power conditions are still before that committee.

"Every member of this association has a part to play in the scheme of general improvement, through the standing committees that represent the various activities. There are now nineteen standing committees in our association and through their chairmen and our secretary, Mr. MacNaughton, have done and are doing most excellent work in their respective lines. It is through these committees that the work of the Association is presented, and our value to the industry whom we serve must depend in a great part on their chairman and members working with the Association as a whole.

"I would like to see each member express himself along the line of work with which he or she is connected. Time away from our regular vocations is, of course, the difficulty, but there are a large number of subjects that are of interest to the manufacturer and operator that, put in form for presentation, will be gladly welcomed. Select your subject, write it up, and present it to your chairman if you are a member of a standing committee, or if not, forward it to your secretary, Mr. MacNaughton, who will pass upon it and arrange for its disposition.

"Membership is another important consideration. We have today all told 560 members, but there are yet a large number of Technical workers in the industry who are not members of our association, but should be. Let each member take it upon himself to interest one or more whom he knows to be qualified for membership, and have them join us. In 1914 this Association was formed with 150 members; today we have roughly 560. An increase of 280%; or a yearly increase of 32%, and we should have a continued yearly increase not

Picture taken of representatives to T. A. P. P. I., Supts. and Cost Accountants' Convention.

less in any case. While numbers in membership is not the answer to success by any means, yet it is indicative of the health of the Association, and the greater the membership the broader the field, and the more interest there must be in the work that is to be done.

"The meeting has every indication of being a most successful one, both the Technical, Superintendents' and Cost Associations' Committees having worked hard and faithfully, and I feel certain that we will all enjoy ourselves and derive much benefit from what we are to hear and see, and in the contact with our fellow members that follows."

Secretary McNaughton's Report

Secretary W. J. McNaughton gave a very complete report of the work accomplished since the last meeting. He spoke of some proposed amendments to the present by-laws of the Association and dwelt at considerable length on the importance on two new proposed sections, one dealing with honorable mention by which the outstanding achievements of members, or men outside of the membership association, may be given recognition, and the other having to do with the formation of local sections. Mr. McNaughton said that it is his belief that the Technical Association would be greatly strengthened so far as the benefits to the members individually are concerned, if local groups were encouraged to meet together once a month or oftener, if possible, for a more or less informal meeting to discuss their common problems. The suggestions are to be placed in the hands of a committee, who will arrange them in the desirable form for final voting at the annual meeting next April.

Mr. McNaughton spoke of the valuable work on the "Action of the Beater," by Dr. Sigurd Smith, which is being published by the Technical Section of the British Papermakers' Association. Dr. Smith's work was the result of eight years' investigation into the beater action. The Secretary then followed with an account of the progress of the work on vocational education. He spoke of plans which were being worked out to develop a system of apprenticeship and stated that a well defined plan is already being employed by the Pejepscot Paper Company, Brunswick, Maine, and the Interlake Tissue Mills, Ltd. at Merriton, Ont. This plan of apprenticeship is intended to make papermakers with a general knowledge of the whole industry, and includes the study of the five-volume text books, "The Manufacture of Pulp and Paper," which are nearly all complete.

Reports of Standing Committees

The reports of the various Standing Committees were then read and in connection with that on Heat, Light and Power, a suggestion was made by J. H. Slater of the Escanaba Paper Co., that more attention be given to the lighting of machine rooms. He also called attention to the problem of moisture in conduit and the trouble encountered therefrom. George D. Bearce, of the Newsprint Service Bureau suggested that the subject of the power consumption of prime movers should be made a topic of investigation by the Heat, Light and Power Committee.

Kellogg Talks on Vocational Education

Secretary R. S. Kellogg, of the Newsprint Service Bureau gave the following report of the progress of the work of the Vocational Educational Committee:

"We find ourselves in a very unusual position here today. For five years we have been coming before you, mostly unsuccessfully, for money; today we come before you and tell you we don't want it. So we feel pretty good. We were in the dumps for a long time, of course, and the Canadians rather put it over us, because the Canadians by means of assessment on the entire industry, went ahead with annual assessments of $5,000 apiece until they put up $25,000 for the fund. By means of begging and pulling people's legs and doing various other more or less illegitimate things, we have got up to $23,000 in the United States. Then we got the bright idea of getting a new man from Wisconsin on the Executive Committee of the Technical Association. When we discovered we needed $5,000 more, he said he could get it and he has darned near done it.

"So financially, the Vocational Educational Committee today, the joint committee made up of the United States and Canadian Sections, has all together something over $8,000 in the bank. There is about $3,000 unexpended of the last Canadian appropriation; there is about $5,600 in the Technical Section to the credit of our committee.

"Volume Four of the textbooks has passed galley proof and will be out pretty soon. Volume Five will follow pretty quickly thereafter. Then we will clean up our outstanding bills which will not be very large. While I can not say definitely at this time, we shall probably have in our joint fund out of these contributions of the United States and Canada, five or six thousand dollars left over after Volume Five is out. That will be devoted to further promotion of vocational education as a means developed for doing that.

"In addition to that, we will be steadily accumulating in another fund the returns from the royalties on the textbooks. That is very carefully set down in a separate bank account and nobody is being allowed to draw against that fund for any purpose whatsoever. The fund at the present time is between seventeen and eighteen hundred dollars and when all five of the volumes are out it will increase much more rapidly. That is to be salted away, to be used entirely according to the judgment of the committee for revisions of the books in the course of preparation of future editions which are going to be necessary. By the time we get through with Volume Five, we will have to start the revision of Volume One in order to keep up with the progress of the industry. So the com-

In front of new Community Hall of Kimberly-Clark Co., Kimberly, Wis., Oct. 27, 1923

mittee finds itself to-day in a very happy situation as far as its finances are concerned.

"The big job before the industry from now on, after having put $50,000 into the preparation of these books, is to see that somebody uses them. That job has not been very well done so far. I think it is going to be in the course of time, and is being done. Unless it is done the industry will not get its money's worth out of what it contributes. But with the appearance of the last two volumes which deal particularly, of course, with paper making, I feel we are going to find a great many opportunities opening up for the enrollment of students in correspondence classes, for the organization of local classes in the paper making centers, and for the use of the textbooks in other ways.

"As I said, even though the membership in itself of the Technical Association hasn't been able to do much towards raising the money, the individual members of the Technical Association do have a big responsibility, I think a big opportunity, to see that the books are used. I think, every member of the Association has an opportunity to get in a word here and there now and then to see that classes are organized in his own particular locality and classes of students in the mills, if he will go ahead and use these books.

"So carrying that along together with the new work which has grown directly out of it on apprenticeship, as Mr. MacNaughton has spoken of, there is opportunity and responsibility for unlimited work as long as this Association stays in existence in educational lines."

A very healthy and beneficial discussion followed the remarks of Mr. Kellogg. Mr. MacNaughton then led an exceedingly interesting discussion on the possibilities of vocational education. He said in part, which follows:

"The inception of such work as the instruction and education of the mill worker must begin by personal contact and personal encouragement in the mill itself. The courses which are offered by the University of Wisconsin in the industrial and domestic arts are there, the students are there, but we must remember that the average man, whether he is middle aged or young, in a paper mill has a job at which he works eight hours a day or more, sometimes at night, and he isn't inclined to devote so much of his spare time to study which he would much rather, as we all do, devote to some amusement. Consequently, not only encouragement in some financial form but also personal support and encouragement in a personal way must be given.

A good many of the mills have given the financial encouragement by paying for the entire cost of a course which a man takes, provided he finishes it with satisfaction. In other cases, they pay half of it; in other cases still, if he completes the course satisfactorily, they pay for the textbooks. In some cases like that I know, the vocational education is fairly well established, and it is generally well understood that when promotions come, when promotions are possible, the man who gets the first chance at the better job is going to be the man who has taken a course. Whether that is advisable or not depends on circumstances.

"In general, first of all should come the personal encouragement from the heads of departments and the management generally towards the educational development.

"There are a good many men who have had a broad education that have dropped back practically into a routine. What we all need every day is mental stimulation. It is such meetings as these that give us mental stimulation. I have always believed that a superintendent, no matter how bright a man he may be, should not stay at his mill twelve months in the year and fifty-two weeks in a year, perhaps eight hours a day, and perhaps twelve. The more intense a superintendent is, the more reason there is for him to get out and meet other men in the same line or in other lines and get stimulation. If he can be forced by his company to take two weeks every year and see some other mills and some other men, he is going to come back, regardless of how good a mill he has, with a more active mind and achieve better results.

"So I say the matter of mental stimulation, whether it starts down with the grinder man in the grinder room or the coal shoveler in the yard, or up at the superintendent or mill manager, is a large part of the success."

Report on Investigation of Decay in Pulpwood

An informal report of the investigation into the problem of the decay of pulpwood was then given by Dr. J. D. Rue, of the Forest Products Laboratory, Madison, Wis., who said that in the study of the decay of woodpulp the Laboratory has found that there are several chemicals which can be applied economically to groundwood pulp especially, and satisfactorily prevent decay over a period of six months or a year, and leave the product in a usable form. While the tests have only been going on for a short time results have been reported as highly favorable from the mill. The study of the decay of pulpwood, he said, is apparently a very much more difficult one to get hold of, because it isn't something which can be prevented except by proper methods of handling, and even then decay takes place in the woods and the mill has to meet the problem of taking or refusing wood that has already been decayed. The phase of this problem which the Laboratory has taken up heretofore has been largely the question of proper methods of handling the wood, either in the woods or the yard, so as to prevent further decay as far as possible, and some very favorable economic results have been obtained thus far. Dr. Rue spoke of the further vital question having arisen concerning the scaling of the wood, and how far decayed wood can be included in the mill supply without suffering economic loss and without deteriorating the product beyond what the mill can endure. Through the co-operation of the Laurentide Company of Canada, a carload of carefully selected wood, representing several types of decay prevalent in that region, was placed at the disposal of the Forest Products Laboratory at Madison, Wis. The wood was selected by pathologists representing the Laurentide Company, in co-operation with Dr. Humphrey, the pathologist of the Forest Products Laboratory. Following the selection of the wood, Dr. Humphrey went into New England and made a brief study of the conditions there to see to what extent the same types of decay were represented there, and they were found to be the same.

Dr. Humphrey was then called upon to relate the method by which the wood was selected and something of the pathological condition of it. He said that the underlying thought in the whole study and investigation of decayed wood was the idea of further utilizing the material which is available in the forest. Perhaps some mills estimate in Canada that they are getting from six to eight or ten per cent rotten wood in the piles as it comes, but at the same time there is a tremendous lot of other material left in the Canadian woods which is believed to be useful for pulp. This is not a Canadian condition entirely, he said, but one that is just as adaptable to the American woodlands. There is the balsam and spruce forests in the Lake states and New England states and the condition of those forests is bad, as they contain a tremendous lot of rotten wood, from which we are cutting for pulping operations quite strongly. Dr. Humphrey then exhibited a number of short logs showing the different principle types of decay.

Mr. Miller, of the Forest Products Laboratory, who has charge of the sulphite pulping of the wood gave a brief account of the cooking results. This work is still in progress and will not be completed for two or three months yet. Mr. Miller's report was in part as follows:

"The samples of wood were all received at the Forest Products Laboratory in the form of four-foot posts. In preparing the woods for cooking, in the case of the heart rotted woods, they were barked down severely, cleaning them up thoroughly. In the case of the sap rotted specimens, the cutting for barking was only carried on to just the very limit of the bark, so the entire quantity of sap rotted material would be left.

"After barking, the logs were cut into two-foot sections on which we outlined the area of visible rot. We made no attempt to differentiate between the various degrees of hardness found, but outlined only the section of visible rot, and all the measurements or figures on per cent of rot were on the outline measurement. Having the measure of the outline of both the visible rot and stick after barking, we ran a perimeter over it and got the area, and then by multiplication of the length of the block got the proportion of sound and rotten wood.

"The blocks were chipped in a small chipper, sampled for moisture, and the weight of the stick as received calculated from the determination of moisture and the weight of the wood received as green wood. From that, the weight per cubic foot of wood was obtained.

"In chipping and preparing the chips for cooking, no screening was carried on. We separated only the knots which we knew wouldn't cook, but cooked the dust and refuse, everything in fact that came in the stick. That was to get a comparison between the total possible yield form a stick and an idea later of the losses that the wood would experience in going through the wood room.

"The method of cooking followed closely the ordinary news print cooking method. We cooked eight and one-half hours. The figures that we have to date include first a specimen of sound wood that came from the same locality as the rotten sections, upon which we obtained a weight per cubic foot of 20.75 pounds; per cent yield by weight of bone dry pulp on bone dry wood, 50.5; yield per cubic foot, 10.47; pounds per cord air dry pulp, considering ninety cubic feet to represent a cord, of 1,049. That is balsam. The yield 50.5 per cent represents pretty close to the maximum possible yield. Balsam won't yield much more than 1,050 pounds per cord.

"On the first specimen, the sap rot, the weight per cubic

foot is 18 pounds; yield in per cent by weight 40.6 in comparison with 50 per cent of the sound wood; the yield per cord of air dried pulp was 735 pounds.

"The next specimen, the brown heart rot, had a greater density than the sound wood. The density runs to 20.95 pounds per cubic foot; the per cent yield by weight was 51.9, nearly 52; the yield per cord was 1,085 pounds.

"The next specimen, sap rot, gave a weight per cubic foot of 17.8 pounds; a yield of 50.6 per cent by weight, and 901 pounds per cord.

"The last specimen, the heart rot in spruce, had a very high density in comparison to the others, 23.8 pounds per cubic foot; yield 52.2 per cent by weight, and 1,161 pounds per cord.

"In the case of the brown heart rot, 55 per cent of the stick was rotten. In the case of the sap rot, 66 per cent was rotten, and of the final specimen of spruce, 96 per cent of the wood was infected.

"In translating those values to mill operation, the yields recorded of the specimens ran practically the same as obtained in mill operation under the best conditions.

"We haven't done anything as yet with the bleaching of the specimens, and as far as their operation on the machine is concerned, it appears the more pronounced the infection is the more pronounced the quality will be a trifle slow, it tends to slow up the pulp when it is made from rotten wood."

Considerable discussion followed Mr. Miller's talk.

O. M. Porter Talks

The morning session closed with a short talk by Mr. Porter, Secretary of the Woodland Section of the American Paper and Pulp Association, who spoke on the co-operation with the Woodland Section on the apprentice training proposition. He said in part as follows:

"The unfortunate situation confronting the paper industry of the United States today is that there isn't enough wood to go around. We have been getting all of the wood we need and we will probably continue to get much of the wood we need. The fact remains, however, that the lumber and pulp interests of the United States are cutting the forests of the United States anywhere from four to six times as fast as they are being replaced by natural growth. We are burning up tremendous quantities of wood. We are losing tremendous quantities annually by fungus and insect depredations. We have been getting considerable supplies of wood from Canada. We may continue to get considerable supplies of wood from Canada and we may not.

"Now it strikes me that possibly there is an opportunity for direct co-operation between the Technical Association and the Woodlands Section in your apprentice proposition there in the woods. The time is coming when pulp and paper companies can afford, must afford to pay more attention to the management of their timber land holdings and the actual growing of pulp, and that can be assured only by the employment of men who know their business in the woods. I refer to the trained foresters. Your companies employ trained, skilled, highly paid chemists, engineers and superintendents; your companies have made tremendous investments in plant and mill equipment, but they have not kept pace in the woods. The time has now come when I believe every pulp and paper company, only in expansive areas of timberland, should and could and can afford to put a trained forester in charge of their woods operation; that is to say their woodlands, not necessarily the woods operations. My thought, Mr. Chairman, is that possibly through the Woodlands Section your committee can find some real co-operation in bringing young, inexperienced foresters who have had the technical training but who lack the practical experience, up into the industry through direct apprenticeship in the woods."

JOINT SESSION

The joint session of the three Associations was held in Eagle's Hall, from 2:00 to 3:00 o'clock on Friday afternoon. B. T. McBain, Assistant General Manager of the Nekoosa-Edwards Paper Company, acted as chairman and opened with the following address:

"Ladies and Gentlemen, Honorable Mayor of the City of Appleton, Members of Technical, Superintendents and Cost Associations, Friends:

"Only a day or two ago I learned through an article in the press, that the Appleton Committee had selected me to act as chairman of this joint meeting of members of the Superintendents, Technical and Cost Associations of the American Paper and Pulp Industry, giving as their reason that they thought I would be neutral, being an active member of the first two Associations and having once been a cost accountant, though never a member of any cost organization, I regret to say.

"It is an honor, I assure you, to be selected for this high seat and I will try to fill it with favors to none and fairness to all. To be sure of this point, the committee arranged the program and gave me full power only to call and introduce the four speakers of the afternoon.

"It is an honor further, however, for the reason that this is the first joint convention of members of these three truly great Associations of the 7th greatest industry of our own America. The industry needs more such meetings, where all departments may become better acquainted, rub shoulders together and learn that they are not such bad fellows after all, learning that the industry needs all three types of men that these three Associations represent, needing one just as much as the other.

"There was a time when the profit in the pulp and paper industry in America was so great that the bank balance of each company told the story in a manner satisfactory to the Board of Directors, without expensive cost systems; when the amount wasted, everything from log to finished product, went by unnoticed and the technical man was not of so much face value, nor even thought of; when the superintendent was lord of all he surveyed and did not need assistance from anyone, or at least thought he did not. These conditions have changed, our timber supply is about exhausted; the margin between cost and selling price is many times on the wrong side, while the waste in many if not all plants amounts to more than the old time profit, and the industry now badly needs that complete co-operation that alone can bring results; that complete co-operation from each of the three types here seated, that each of the three legs of a three-legged stool lend each other. When that is accomplished, then and then alone will the Pulp and Paper Industry in America be on a right basis. The superintendent who thinks he knows it all is going backward; doesn't belong to the Superintendents' Association and the Superintendents' Association does not want him as a member.

"The technical man who flags or waves his education and technical terms in the face of his fellow worker, the superintendent or cost man, is not worthy of the name of a technical association brother; the cost man in any plant who takes things over the head of the superintendent or his fellow worker, the technical man, without trying to co-operate with the other two, will never get ahead and reach that goal of success we all look forward to.

"We all have positions of responsibility and where responsibility lies, there must authority also rest; but just because we have certain authority is no reason why we should consider we have it all, nor why we should exercise what we do have. We must give and take in this life, and those who are so inclined make the best executives and get the best results.

"I look forward to the day when the annual convention of these three co-operating associations will be held at one time for three or four days to a week, and at least one day thereof given to joint papers and discussion and a general love feast. In fact, I recommend such action at this time to the National officers of the Technical Association, as well as to the Division and National officers of the other two Associations, who may be present."

Mr. McBain's address was followed by a short responsive welcome from Mayor Reuter of Appleton, which was then followed by addresses from the chairmen of each of the three associations.

Mr. Taylor's Address

President Howard S. Taylor of T. A. P. P. I. spoke on the behalf of his association in part as follows:

"To the members of the Superintendents and Cost Associations, I can say that we feel that this meeting in joint session is an event to be long remembered. While each association has its own distinctive problems to attack, and work out, requiring individuality of direction, yet joint sessions such as this in which we can discuss our various activities and personal problems are surely the right step, and one that if followed will bring a more efficient service to the pulp and paper industry which we serve in common.

"The superintendent, the technical man and the cost man, a trio, each striving for the single object, more production, better production and at lower cost. If it be for a single objective, why then are not those who strive, in a way dependent one on the other?

"Let us substitute for the person, words representing vocations, namely—theory and practice. Theory must have practice to prove it more than a word, and practice without theory brings us back to the beginning of things. But neither theory nor practice are of value unless delivered at a cost that insures a sale value. The trio is again in joint session.

"We have the airplane, the automobile, the artificial ice plant, the paper machine, and countless other time and life savers that theory, practice and accounting have given us.

Theory planned and perfected, practice put together and produced, and accounting fitted to our pocket. The superintendent, the technical man and their guardian, the cost man—and without any one of these three we might still be hunting our food with stone clubs and reading the day's events in hieroglyphics from the same material.

"What we all want are facts. We ourselves or our business cannot progress without them. The successful nations are those who continue unceasingly to discover facts, the unsuccessful, those who exist on opinion, or impulse, and starve or live high, depending on whether the impulse is wrong or right.

"Everyone can have an opinion, but what good is it without the facts? The technical and cost men are on the job to run down facts, and thereby prove or disprove opinions if they exist. These facts the superintendent turns into production, and if they are facts and in the right direction, the answer is the objective we seek—more production, better production and at lower cost.

"We three, the superintendent, the technical man and the cost man, are here together in joint session, and from the spirit that has prevailed I am most certain that it is but the commencement of a mutual relation between our respective associations that, if carried on and upward, will make these three associations of the pulp and paper industry a trio which will be hard to excel."

F. O. Boyce Talks for Superintendents

F. O. Boyce, past president of the American Pulp and Paper Mill Superintendents' Association, in speaking on behalf of his association related some interesting historical facts pertaining to the establishment of the paper industry in Appleton. Mr. Boyce related that the first paper mill in Appleton was started by G. N. Richmond and Bros., making straw paper in the early '60's on the site now occupied by the Interlake Mill of the Consolidated Waterpower and Paper Co. The Appleton Pulp and Paper Co. was organized by H. J. Rogers in about the year of 1870. The Bradner, Smith & Co. pulp mill, with O. W. Clark as manager, began about 1878. In about 1879, Gen. Avery and W. H. H. Stowell founded the Atlas Paper Co. on the site of Whorton's sawmill.

The Fox River Paper Co. converted the old stone flour mill into a rag mill in 1884, with J. H. Whorton as president and John McLaughlin as superintendent. About 1884, the Kimberly-Clark Co. bought the old Conkey flour mill, east of the Appleton Pulp and Paper Co., and converted it into a paper mill, calling it the Vulcan mill and adding a new building on the west calling it Tioga. Tom Pearson came in about 1880 as superintendent of the Atlas and P. R. Thom came about 1884 as superintendent of the Vulcan and Tioga mills.

About the same time Hyde and Parkhurst built a frame mill west of the Appleton Machine Co. plant and called it the Valley Paper Mill, which was later bought by A. W. Patten and converted into a pulp mill. About 1878, Billings and Morrison operated a strawboard mill on the same premises. About 1890, the Kimberly-Clark Co. built the Telulah mill and in 1893, Thomas Pearson, W. B. Murphy and H. D. Smith built the Riverside pulp mill and several years after, the paper mill. About 1886, A. W. Patten built the Patten paper mill. The Interlake was built in about 1898 and the Wisconsin Tissue about 1905. The Appleton Coated Paper Co. was erected about 1912.

Jasperson on Behalf of Cost Association

President C. A. Jasperson of the Cost Association of the Paper Industry next gave an address on behalf of that association, and said in part as follows:

"Twenty years ago, cost men were not known. When a concern started up in business they would give a bookkeeper a little desk over in the corner, an office about eight by ten. Everything that was bought he charged on one side; everything that was sold he credited on the other side. It didn't make any difference if you bought a belt he charged it to expense, if you bought a grinder he charged it to expense, and if you built a new sulphite mill he charged it to expense. In those days that sufficed, because if the bank account showed that they had money on hand that was all that was necessary. They didn't care where the money came from. If they sold part of the mill and had more money than they needed, they declared a dividend. There were usually only about two people to get the dividend. There were no bond issues, no interest to be paid on bonds. There was no troublesome income tax blank to be filled out.

"After a time these conditions changed. A few of the owners finally passed on to that land from which no traveler returns. His stock was divided up among his heirs and his heirs wanted to expand, and sold part of their stock. So in place of one mill composed of half a dozen stockholders it finally grew to one with three hundred stockholders. Then they could no longer run the same set of books as in the time when they had but two or three stockholders. The mill began to expand. They put out bond issues, and it was necessary that the books be set up on a scientific basis.

"You have heard the story of the two gentlemen who asked each other the question as to who was the greatest man. One answer was that the man who invented interest was the greatest man in the world. But, honestly, I believe the man who invented the income tax was really the greatest man who ever lived. On account of the income tax which we have to fill out every year, it has become absolutely necessary that our books be set up on a scientific basis, so that when we buy a new grinder that grinder should not be charged to expense. That is a property account. If you replace one that has only been used one year, part is expense and part is depreciation. But on account of the keen competition we have today it is absolutely necessary books be set up scientifically, that costs be gotten directly from each department. In the running of a sulphite mill or a pulp mill, the cost to make the common sulphite is very easily gotten out. But in those fields today you are making more than one grade of paper, and it is, therefore, necessary that you apply the correct charge against each grade of paper. Just the item of power will make a difference in the cost of that sheet of paper. The low grade sheet of paper, of course, will not consume as much power as the high grade sheet of paper will. Therefore, it is absolutely necessary that in order to know what your costs are you know the cost in connection with each particular grade of paper.

"I have often heard superintendents say that they have absolutely no confidence in the figures turned into them by the cost department. Now, Mr. Superintendent, I want to tell you right here that if the figures that the cost man turns back to you are full of errors you are nine-tenths to blame for it.

"When you stop to think that in a mill employing a thousand men your accountant department has to depend on at least one hundred men in the mill to turn in correct figures, and I want you to stop and think that a great many of those men who are turning in the figures to the superintendent and the cost department can hardly write their own names. In a great many instances we have to make it just as simple as possible, so that we can make the figures correct. In the grinder room instead of asking the grinder man to mark down a number or just a mark each time he grinds a cord of wood we simply ask him to move a peg, so he does not have to use his brain at all.

"Now, then, if the superintendent does not turn into the cost man correct figures he can't turn back correct figures to you. Let's take, for instance, in the grinder room, if a grinder man grinds two or three truck loads of wood per night in a night shift and wants to make a good showing and reports back that he has ground six or eight truck loads, or two or three more than he actually has, it is going to throw your figures off. In the beater room if the beater man does not report the amount correctly, your cost figures are going to be off. You get up to the paper machine. There seems to be a spirit of competition there, and they like to show all the paper that has been made. You can easily see what that does in the way of getting correct cost.

"I want to say in closing that mills have been comparing figures lately trying to find out which mill has the best cost system and the best costs. It is rather difficult to get a great number of mills to report to one bureau, but here is just a little suggestion I would like to make. Take in the Fox River Valley you may have two, or three, or four mills each with a boiler plant, each with a wood room, still your paper mill may be entirely different. But when you go home go to your cost accountant, find out how much it is costing you to prepare a cord of wood. In those figures be sure that he includes the depreciation, income tax, and those other figures. Take the figures to some other superintendent and find out how much it costs him to prepare a cord of wood. If the other superintendent is able to prepare a cord of wood for less than you have been able to do it, compare your figures with the accountant's figures and see if there are any mistakes in the figures. If there are no mistakes, see why it is costing you more to prepare a cord of wood than the other fellow.

"Do the same thing with the boiler house. Finally get two or three mills together and compare your figures, and I believe you will be surprised to see the results you will get.

"If I were a superintendent I would make it my business to see to it that my costs were the lowest costs of any mill doing the same kind of work, provided the machinery would permit. If you have a wood foreman who has been in your factory a number of years, it is up to you to replace him if he is not giving efficient service. Analyze your cost, work-

ing together with the cost department, and you are going to make yourself more valuable to your employer. You should not think merely of the dollars and cents you are going to save, but in securing this efficiency you are going to create a greater love for the work."

The meeting closed with short talks by Secretary Porter of the Woodland Section and R. S. Kellogg of the Newsprint Service Bureau. The rest of the afternoon was devoted to the individual meetings of each association.

MEETINGS OF FRIDAY AFTERNOON

The afternoon session of the Technical Association was devoted to the reading of the progress report of the committee on waste, which was prepared under the direction of Chairman R. B. Wolf, with the assistance of G. D. Bearce, vice chairman. The latter read the report at the meeting. The report was divided into two parts, the first covering "Heat Losses in Pulp and Paper Mills" and the second "The Handling of Materials." Part Two of this report is published elsewhere in this magazine.

At the meeting of the Superintendents, which was held in Eagle's Hall, the following papers were presented: "Beaters and Beating," by C. E. Youngchild, Superintendent of the Nekoosa-Edwards Paper Co.; "Colors," by K. T. King, of the duPont Co.; "Wires," by G. E. Buchanan, of the Appleton Wire Co.; "Waste in the Sulphite Industry," by O. L. Berger, of G. D. Jenssen Co. Each of the papers, which are published in this issue, brought out considerable discussion and among the most lengthy was that following the talk on wires.

A point regarding the selvedge on the wire was brought up by Mr. Slater, who stated that from his experience a selvedge made of linen or silk is not a good thing. He said that almost invariably the wire is on the machine but a short time when the edge breaks off, or the wire will break lengthwise by the selvedge, the selvedge breaking through the single wire, and of course the edge of the wire has to be stripped off. Favorable mention was made of a French wire, the selvedge of which consists of a little heavier wire rather than the linen or silk, and this ran for four weeks and two days with perfect edges.

Following the corroboration of this point by many of the other superintendents, Mr. Paul J. Seivert, Superintendent of the Marinette-Menominee Paper Co., stated that after trying out a number of different makes of wires he found this same difficulty with all of them, so finally he came to the conclusion it must be some flaw in the machine, or due to the wire freezing to the suction boxes. He got busy therefor and rigged up a one-hand guide similar to the Nash guide. He said that this has seemingly put a stop to the trouble of cracking at the edge. Last year he averaged close to three and one-half weeks to a wire and since applying the guide he is getting four weeks to a wire. It does not seem to crack out so rapidly and the selvedges are not loosened, nor does the wire curl off on the edge and cause a groove in the suction box.

Mr. Slater's experience does not correspond with this, however, and his solution of the trouble is the suggestion to the wire manufacturers to put in a little larger wire where they usually put in the silk or linen and putting it in lengthwise, the same as the French wire, to which he referred.

MEETINGS OF COST ASSOCIATION

The Northwest Division of the Cost Association of the Paper Industry held their meetings on Friday and Saturday afternoons in the Chamber of Commerce Committee rooms, President C. H. Jasperson presiding. Friday's session consisted of round-table talks and included discussion on power and woodroom waste and barking loss. Election of officers was the first order of business at the meeting on Saturday afternoon and resulted as follows: President, Frank Shemanski, of the Whiting-Plover Paper Co.; Secretary-Treasurer, R. D. Baron, of the Marathon Paper Co.; Executive committee, F. V. Vaughn, of the Fort Howard Paper Co.; A. M. Van Douser, of the Marathon Paper Co., and C. H. Jasperson, of the Nekoosa-Edwards Paper Co. The topics discussed at Saturday's meeting were "Distribution of Overhead and Manufacturing Burden," "Handling of Large Repairs," "Depreciation and Obsolescense."

An interesting talk was given to the meeting by Mr. P. Koenig, of the Continental Paper and Bag Manufacturing Co., New York City. Anticipation was expressed of a healthy meeting of the Local Division to be held on December 18 at Green Bay. Membership in this local division entails the payment of no dues, and efforts are being made to interest all the paper mills throughout the state to have their cost accountants participate in the meetings. Expenses are covered through voluntary contributions.

It was announced that the next meeting of the National Convention of the Cost Association of the Paper Industry will be held in Philadelphia sometime in November.

SUPERINTENDENTS BUSINESS SESSION

The business meeting of the Northwestern Division of the Superintendents' Association was held on Friday evening, October 25, at 7:00 o'clock, in Eagle's Hall. Election of officers for the ensuing year was the first order of business and resulted as follows: Chairman, L. E. Smith, Nekoosa-Edwards Paper Co.; First Vice-Chairman, V. P. Edwardes, Interlake Pulp and Paper Co.; Second Vice-Chairman, A. G. Stone, Marinette-Menominee Paper Co.; Third Vice-Chairman, Paul A. Smith, Combined Locks Paper Co.; Secretary-Treasurer William H. Kraske, Consolidated Water Power and Paper Co.

The matter of determining the time and place to hold the next division meeting was discussed and left in the hands of a committee. On the suggestion of Mr. Boyce, a telegram was sent to President Nelson R. Davis, of the National Association telling him of the success of the joint meeting. Announcement was made that the next convention of the American Paper and Pulp Mill Superintendents' Association will be held on May 22, 23 and 24 at Dayton, O.

Very interesting talks were given by Mr. Boyce, Mr. Slater, Mr. McBain, Chairman Smith, and others on the value of the Superintendents' Association, and much was said for the good of the Association. Mr. McBain spoke particularly on the vocational educational work being carried on at the Nekoosa-Edwards Co. under the extension division of the University of Wisconsin. The different superintendents of this company, all of them but one or two, have taken great interest in this work and many of them have taken the courses as well, in order to be at the meetings and help carry them through. This work was begun last year. The men paid from fifteen to twenty-five dollars for their courses, with the understanding that when they finished the course, the company would reimburse them the amount they put in, leaving it so the company had invested that much money and the men had invested that much time in educational work. Out of one hundred and thirty-one who started the course, ninety-eight finished and got their money back. This year the courses have started again and the number has been greatly increased.

Superintendents Meeting on Saturday

Saturday morning was given over to visiting the Kimberly-Clark mills at Kimberly. The company had arrangements so well made that small parties went through under the care of guides and the operations in the various departments were explained on placards hung in conspicuous places. A very bountiful and appetizing complementary luncheon was served by the company in the new community hall.

The superintendents met again in Elk's Hall at 2:00 o'clock in the afternoon and the following papers were presented: "Heat Losses," by E. P. Gleason, Nekoosa-Edwards Paper Co.; "Oiling," by C. H. Brownlee, S. F. Bowser & Co.; "Felts," by A. H. Theurer, Appleton Woolen Co.; "Groundwood," by Lyman Beeman, Superintendent of Groundwood Department of the Wisconsin Power and Paper Co. The usual discussion followed the reading of these papers. These papers are published elsewhere in this issue.

Joint Banquet and Entertainment

An informal banquet was held in Eagle's Hall for all three associations and the ladies at 7:00 o'clock on Saturday evening. A delicious home cooked supper was served under the auspices of the Appleton Woman's Club and the service was performed by these ladies in a most unique and effectual manner. A large bouquet of flowers which graced the speakers' table was presented by the Republic Flow Meter Co. through the courtesy of Mr. John D. Cunningham, of that company. Community singing was conducted by Mr. McBain. The toastmaster of the evening was Mr. Gustav Keller, former postmaster of Appleton, whose remarks were very appropriate to the occasion.

The program consisted of two splendid addresses, the first by George P. Hambrecht, State Director of Vocational Education, on the subject of "The Part Time School Movement in Wisconsin"; the second by Alfred H. White, professor of chemical engineering, University of Michigan. Mr. Hambrecht's address was an inspiring talk on education, filled with facts and figures, which proved his mastership of this subject. A short vaudeville entertainment followed the speakers and concluded the meeting.

LIST OF ATTENDANTS

Superintendents' Association

Adams, A. G., A. G. Adams Co.
Adam, John, Whiting Plover Paper Co.

Alexander, R. H., Nekoosa-Edwards Paper Co.
Andrews, E. K., Itasca Paper Co.
Armstrong, L. B., Gutta Pevelia Rubber Mfg. Co.
Breyfogle, L. H., Draper Bros. Co.
Boisboin, N. M., Sutherland Paper Co.
Boyce, C. K., Consolidated Water Power & Paper Co.
Boyce, F. C., Wausau Paper Mills Co.
Blaine, James J., Crescent Belt Fastener Co.
Bumer, Geo., Falls Mfg. Co.
Benson, Bernard, Williams Gray Co.
Beisel, F. A., Menasha Printing & Carton Co.
Burrows, S. V., Process Engineers, Inc.
Burns, W. H., Valley Iron Works.
Buchanan, G. E., Appleton Wire Works.
Carey, Emmet J., Nekoosa-Edwards Paper Co.
Cline, Felix J., Waldorf Paper Prod. Co.
Croxen, C. A., Vacuum Oil Co.
Cota, Frank, The Falls Mfg. Co.
Costello, John E., Asst. Secy. Supts. Assoc.
Cornell, John, The Paper Mill.
Christensen, Andrew, Rhinelander Paper Co.
Clemons, James S., Hummel and Downing Co.
Christensen, Louis, Standard Oil Co.
Carpenter, J. H., Electro Bleaching Gas Co.
Davis, Jr., W. T., Dells Paper Co.
Dennie, H. E., Security Rubber and Belting Co.
Drysdale, P. W., Appleton Wire Works.
Dowd, A. Scott, THE PAPER INDUSTRY.
Donahue, H. L., Thilmany Pulp and Paper Co.
Dolan, W. J., Rhinelander Paper Co.
Dial, T. E., Vacuum Oil Co.
Dow, Joseph H., Eastwood Wire Mfg. Co.
Davies, D. B., Northern Paper Mills.
Edwards, Vance P., Interlake Pulp & Paper Co.
Everlien, L. H., U. S. Rubber Co.
Enrich, H. E., Mac Sim Bar Paper Co.
Eilers, Frank B., Fred H. Fuller, Kalamazoo V. P. Co.
Foxgrover, Jas., Vera Chemical Co.
Foster, M. T., Nekoosa Water & Machine Co.
Fox, L. R., H. A. Metz & Co., Inc.
Ferguson, W. A., Geo. Whiting Paper Co.
Gustus, A., Menominee & Marinette Paper Co.
Guidotti, W. H., Leavens Guidotti Co.
Gleason, E. P., Nekoosa-Edwards Paper Co.
Gilman, E. H., Bryant Paper.
Hercher, John, John Strange Paper Co.
Henderson, J. D., Paper Industry.
Hayden, E. F., S. F. Bowser Co.
Hanslack, Alfred A., Marinette & Menominee Paper Co.
Horter, C. L., Rex Paper Co.
Haddock, R. W., Escanaba Paper Co.
Josephs, Henry, Daniels Mfg. Co.
Johnson, M. D., Republic Flowmeter Co.
Johnson, F. A., Allied Paper Mills.
Jacobs, C. N., Diamond State Fibre Co.
Kummer, P. J., Tomahawk Pulp and Paper Co.
Kranhold, Fred, Kimberly-Clark Co.
Kraske, H. H., Consolidated Water Power & Paper Co.
Knuth, Theo. H., Interlake Pulp and Paper Co.
King, Kenneth T., Ed Du Pont de Nemours & Co.
Kern, J. F., Great Western Smelting & Refining Co.
Leibrich, M. A., Great Western Paper Co.
Lyrede, C. W., McCauley Belting Co.
Leptwich, H. P., Sinclair Refining Co.
Longfellow, C. F., Sinclair Refining Co.
Lind, Jacob B., Hammermill Paper Co.
Locklin, L. C., Schuler and Benninghofin.
Le Rous, O. L., Nekoosa-Edwards Paper Co.
Lenz, Geo. J., Hoberg Paper Fibre Co.
Meyer, John J., Menasha Printing & Carton Co.
Mulchaeym, J. J., F. Danbeau.
McMahon, C. J., Canadian Robert Dollar Co.
Merrifield, R. A., Imperial Belting Co.
Murphy, F. S., Lockport Felt Co., Cheney-Bigelow, Wis. Wire Wks.
Meinicke, H. D., A. N. Meinicke.
McLintock, A., The Union Sulphur Co.
McKeever, Wm., The Falls Mfg. Co.
McCall, I. R., Detroit Graphite Co.
Bain, B. T., Nekoosa-Edwards Paper Co.
Meidam, Glen, Republic Flowmeter Co.
Massey, Peter J., W. F. Hall Ptg. Co.
Martin, T. B., Industrial Controller Co.
McPhillips, A., R. J. Dowd Knife Works.
Noble, C. H., Staley Mfg. Co.
Nash and Son, Wm. C., Valley Paper Mills.
O'Brien, Eugene, Dells Pulp and Paper Co.
Porter, O. M., Amer. Pa. & Pa. Assn.
Piepenburg, Albert, Combined Locks Paper Co.
Peterson, R. A., Valley Iron Works Co.
Peterson, E. A., Valley Iron Works.
Panushka, Edward, New York Belting & Packing Co.
Rust, E. H., Westinghouse Elec. Mfg. Co.
Rolland, O., Rolland Paper Co.
Redmond, Michael, Kalamazoo Paper Co.
Reiner, H. C., Kuttroff Pickhardt & Co.
Regan, J. E., Cameron Machine Co.
Lancouraneo, P. J., Marinette & Menominee Paper Co.
Radsch, R. M., Thilmany Pulp and Paper Co.
Shields, Ed., Hoberg Paper & Fibre Co.
Stone, A. G., M. & M. Paper Co.
Sheldon, A. F., The Garlock Packing Co.
Sensenbrenner, R. M., Geo. Whiting Paper Co.
Scott, W. H., Kalamazoo Paper Co.
Schreck, Paul, M. & M. Paper Co.
Stoddard, E. H., Appleton Woolen Mills.
Stamm, F. C., Nekoosa-Edwards Paper Co.
Smith, P. A., Combined Locks Paper Co.
Smith, L. E., Gen. Sulphite Supt., Nekoosa-Edwards Paper Co.
Sleeman, A. C., The Grasseli Chemical Co.
Slater, Jos. H., Escanaba Paper Co.
Sievert, P. J., Marinette & Menominee Paper Co.
Tomskey, Geo., Winona Pulp and Paper Co.
Tomczak, S. E., Flambeau Paper Co.
Timmerman, T. J., Northern Paper Mills.
Theroux, Wm. H., Sandusky Foundry and Machine Co.
Vinton, H. K., Paper Trade Journal.
Vickery, F. W., Vickery Hd.
Van Order, Wm., O. C. Keckley Co.
Van Alstyne, J. W.
Wightman, A. G., Hawthorne Paper Co.
White, Alfred H., University of Michigan.
Whittiger, F. A., Kuttroff Pickhardt & Co., Inc.
Weir, Andry, Wausau Paper Mills.
Watson, John D., Wisconsin Wire Works.
Wall, J. J., General Electric Co.
Williams, E. H., Williams Gray Co.
Wright, James H., Wm. Cabble Mfg. Co.
Youngchild, C. E., Nekoosa-Edwards Paper Co.
Yule, W. A., T. C. Huyck & Sons.
Zelinske, Jos. P., McGillan Asmuth Paper Mills.

Technical Association

Alexander, John E., Nekoosa-Edwards Paper Co.
Allen, Amos L., General Electric Company.
Armstrong, A. E., Armstrong Machine Works.
Artz, W. H., Westinghouse Elec. & Mfg. Co.
Baird, Parker K., U. S. Forest Service. F. P. Lab.
Baker, W. E. Byron, The York Haven Paper Co.
Bearce, Geo. D., News Print Service Bureau.
Bersch, John S., Falls Mfg. Co.
Berger, O. L., G. D. Jenssen Co.
Booth, L. M., Booth Chemical Co.
Bosworth, Ralph L., Crocker McElwain Co. & Chemical Paper Mfg. Co.
Brayton, S. C., Consolidated Water Power & Paper Co.
Cameron, James A., Cameron Machine Co.
Carey, James L., James L. Carey Co.
Christiansen, C. J., Fibre Making Prov.
Codwill. P. W., Beaver Products Co.
Cronkhite. W. W., General Electric Co.
Dennett. Phillip. Bird Machine Co.
Egan, O. S., Nekoosa-Edwards Paper Co.
Edmonds, T. L., Wausau Paper Mills Co.
Enderlein. Gust. Ferd., Ontonagon Fibre Co.
Erisvan, Ervan. Marinette & Menominee Paper Co.
Gordon, I., Lee Paper Company.
Guettler. H. W., Fibre Making Processes.
Harper, R. O., B. D. Rising Paper Co.
Harrison. H. H., Crystal Tissue Company.
Hanson, John A., Menasha Printing & Carton Co.
Henderson. Chas. L., Kimberly-Clark Co.
Hocklev, C. C., American Lakes Paper Co.
Kellogg, R. S., News Print Service Bureau.
Lawrence, W. L., Western Paper Makers Chemical Co.
Lofton, R. E., Bureau of Standards.
MacDonald. C. R., Gardner & Harvey Co.
MacNaughton, W. G., Secretary T. A. P. P. I.
Mahler. Ernst. Kimberly-Clark Co.
Miller, R. N., U. S. Forest Products Laboratory.
Montgomery, A. E., J. O. Ross Engineering Corp.
North. R. G., G. B. Lox Mch. Wks.
Pitts, W. A., York Haven Paper Co.
Randall. Arthur T., Westinghouse Elec. & Mfg. Co.
Randecker, L. E., Hammermill Paper Co.

Rawling, Francis C., Forest Products Laboratory.
Rothschild, Henry A., Kimberly-Clark Co.
Rue, John D., Forest Products Laboratory.
Savey, Jr., Thomas H., Bird Machine Co. and Nash Engineering Co.
Scribner, B. W., Bureau of Standards.
Spence, G. K., New York and Penn. Co.
Staege, S. A., Westinghouse Electric & Mfg. Co.
Summers, B. S., Port Huron Sulphite Co.
Sherman, Benj. H., Northern Paper Mills.
Taylor, H. S., H. S. Taylor Co.
Tucker, E. C., Chemical Pa. Mfg. Co.
Wells, Sidney D., Forest Products Laboratory.
Wiberg, A., Gilbert Paper Co.
Wilcox, A. F., United States Rubber Co.
Williamson, J. L., J. O. Ross Engineering Corp.
Woodsome, John O., John O. Woodsome & Co.
Zilske, Paul, Detroit Sulphite Pulp and Paper Co.

Cost Association

Baron, R. D., Marathon Paper Mills Company.
Deyo, Harry, Nekoosa-Edwards Paper Company.
Harky, J. A., Tomahawk Fibre & Paper Company.
Hemminger, John, The Falls Mfg. Company.
Jasperson, C. A., Nekoosa-Edwards Paper Company.
Koenigs, Paul, Continental Paper Bag Mills.
Korth, Herman A., The Falls Mfg. Company.
Larson, L., Menominee & Marinette Paper Company.
Lindberg, E. A., Northern Paper Mills.
McIlm, D. J., Falls Mfg. Company.
Plier, A. M., Falls Mfg. Company.
Zimmermann, Arthur A., Hummel & Downing Co.

Lubrication of Paper Mill Machinery*

By CHARLES H. BROMLEY
Manager, Lubrication and Filtration Division, S. F. Bowser & Co.
Fort Wayne, Indiana

ALL who are only fairly well familiar with the lubrication of bearings know that stream or flooded lubrication is much more effective and economical than any other method. For this reason all modern machinery is, or should be, provided with bearings or with housings (in case of gears, for example) adapted to, and to permit of such application of the lubricant.

For practically all purposes except for steam engine cylinders, extremely heavy slow-speed gears, some machine tool cutting requirements, a straight run mineral oil containing no animal or vegetable fats is universally used. The reason is that pure mineral petroleum oils wear out extremely slow in service if properly kept clean.

Fig. 2—Type AS filter used for the continuous filtration of oil with Bowser lubricating systems

Lubrication in Paper Mill Power Plants

Steam turbines in modern mill plants have their own oil-holding and circulating systems as integral parts of the turbine. The turbine base usually houses the oil and the latter is circulated to the bearings and back to the base continuously and under slight pressure by a rotary oil pump located in the base and gear-driven from the main shaft. Fig. 2 shows the Type A filter widely used on oiling systems in paper mills.

Because of the extremely high temperatures, high journal speed and not any too modest bearing pressure, also because of water finding its way into the oil, and due to the very rapid circulation of oil in the system, turbine oils soon develop emulsion, insoluble and soluble sludge, and organic acidity. To avoid rapid deterioration of the oil, it is invariably kept clean of the above impurities by continuous filtration. The system now in most general use for purifying steam turbine oils is the continuous-by-pass-batch filtration system. The system consists of a dry principle, vertical unit filter, a two-compartment precipitation tank, the oil pump and a vented sight overflow for each turbine base. Purification of the oil is continuous through the filter and back to the turbine oil reservoir. This process removes all water, solid impurities and the insoluble sludge. Once each week, or about such interval, all the oil in the turbine reservoir is run into the empty compartment of the precipitation tank, and allowed to settle for a week or more. This allows the oil to cool, which throws the insoluble sludge out of solution—the only way in which it is possible to get it out of the oil. The fact that the organic acid in the oil segregates in great part in the sludge indicates that the sludge has an affinity for the acid. Nothing much is known about this acid other than that it is organic and not mineral, that it gradually increases in content and actively promotes the formation of sludge. It is regarded as by far the most serious impurity in the oil. Its content is usually measured in milligrams of KOH. per gram; that is, milligrams of potassium hydroxide necessary to neutralize the acidity of one gram of oil. Just when acidity of an oil reaches a dangerous content there is no agreement either among engineers or oil men. However, most engineers become apprehensive when the acidity reaches 4.0 or 5.0 mg. of KOH. per gram of oil. Then they usually replace the oil with new oil. Acidity will, however, be kept down if the insoluble sludge, water, dust and other solids are kept removed from the oil as fast as they accumulate.

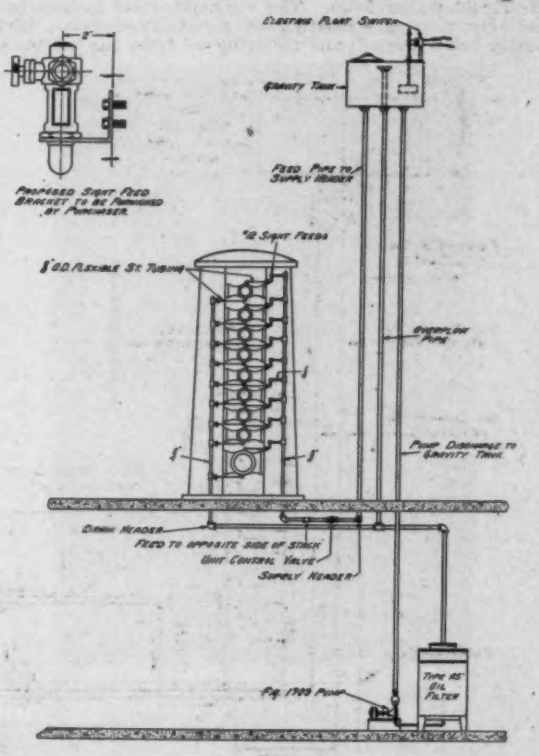

Gravity Tank
Feed Pipe to Supply Header
Proposed Sight Feed Bracket to be Furnished by Purchaser
12 Sight Feeds
Pump Discharge to Gravity Tank
Feed to Opposite Side of Stock
Shut Control Valve
Supply Header
Type AS Oil Filter

Fig. 3—Layout of Bowser system of continuous stream lubrication of machine and super calenders

*Presented at the joint meeting of Tappi and Superintendents at Appleton, Wis., October 27, 1923.

Hydraulic vertical turbines of comparatively recent design are lubricated by mineral oil completely surrounding the main bearing which is usually of the pivoted, segmental ring type, wherein the bearing is in the shape of a ring or disk divided into many segments, each of which is pivoted at its center and capable of tilting, so as to insure that an oil film in the shape of a wedge will obtain between each segment and the riding ring. The bearing complete is submerged in oil contained in the tub or housing, which is dust proof. This oil is kept cool by a pipe coil placed in the oil bath and through which cold water flows. The oil purification system is exceedingly simple, consisting of a CS Type filter, located usually below the tub and receiving oil from the tub through

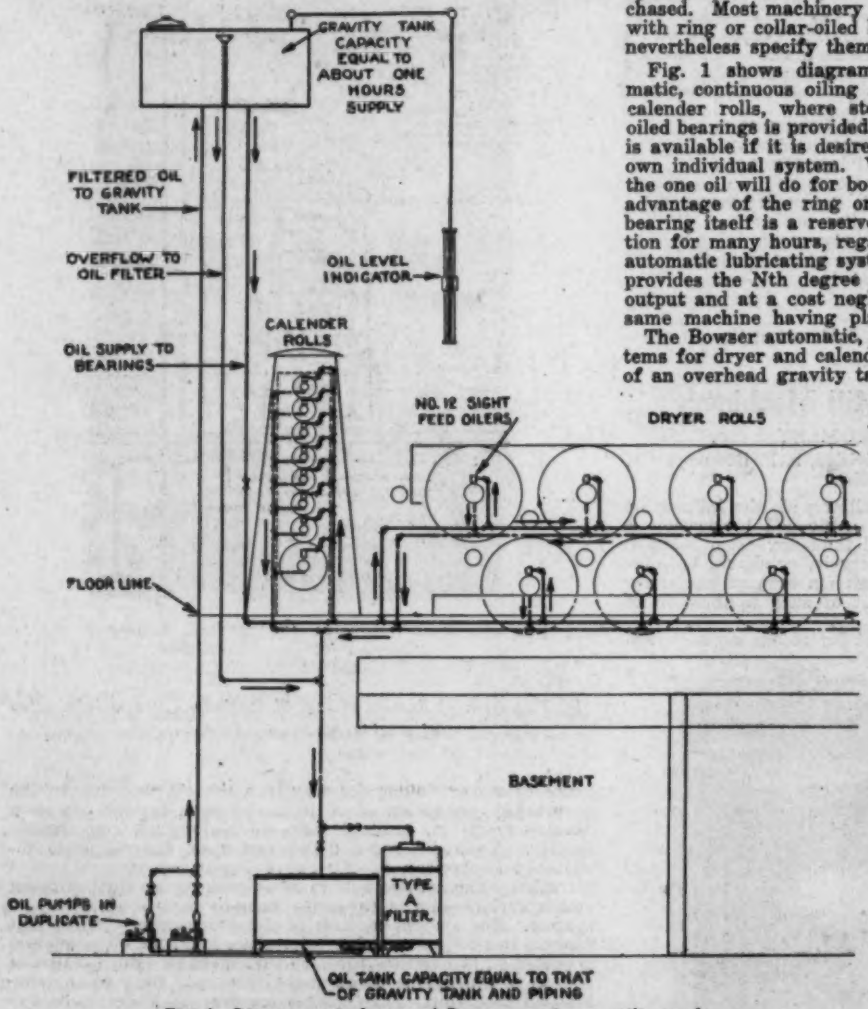

GRAVITY TANK CAPACITY EQUAL TO ABOUT ONE HOURS SUPPLY
FILTERED OIL TO GRAVITY TANK
OVERFLOW TO OIL FILTER
OIL LEVEL INDICATOR
CALENDER ROLLS
OIL SUPPLY TO BEARINGS
NO. 12 SIGHT FEED OILERS
DRYER ROLLS
FLOOR LINE
BASEMENT
OIL PUMPS IN DUPLICATE
TYPE A FILTER
OIL TANK CAPACITY EQUAL TO THAT OF GRAVITY TANK AND PIPING

Fig. 1—Diagrammatic layout of Bowser continuous oiling and filtering systems for dryer and calender rolls

a vented sight-overflow which keeps the oil in the tub at a constant level. The filtered oil is taken from the filter by a simple motor driven rotary pump that discharges it into the tub. Circulation and purification are continuous. There are many other forms of connection for hydraulic turbine oil purification systems, but the one here described is typical of industrial plant installations.

Oiling Systems for Engines and Compressors

The individual oil and filtering system is now universally used on steam engines, air and ammonia compressors. Such a system is adapted to all reciprocating engines and effects continuous, controlled lubrication of all bearing surfaces and continuous purification of the oil. These systems are so simple in their parts that the purchaser's plant engineer can always have them connected up by his own crew. Central oiling and filtering systems are also available for engines where they are grouped in one plant, though the individual system is preferable.

Dryer Rolls

The application of automatic, continuous lubrication and filtration equipment to dryer and calender rolls is new. Yet few pieces of machinery really need such positive application of the lubricant if excessive power consumption, hot bearings, loss of output and damaged stock are to be avoided.

Ring or Collar-Oiled Bearings Desirable for Dryers and Calenders

While automatic, continuous lubrication systems are available for dryers and calenders having plain bearings; that is, bearings not ideally suited to stream lubrication, lubrication is so greatly improved by these systems when used with ring or collar-oiled bearings, that it is a decided mistake not to specify such bearings for all new dryers and calenders purchased. Most machinery builders now provide their machines with ring or collar-oiled bearings. But the purchaser should nevertheless specify them.

Fig. 1 shows diagrammatically a typical Bowser automatic, continuous oiling and filtering system for dryer and calender rolls, where steam lubrication of ring or collar-oiled bearings is provided. A separate system for dryer rolls is available if it is desired that the calender rolls have their own individual system. Where stream lubrication is applied the one oil will do for both dryers and calenders. The great advantage of the ring or collar-oiled bearing is that in the bearing itself is a reservoir of oil capable of giving lubrication for many hours, regardless of what may happen to the automatic lubricating system or to the operatives. It simply provides the Nth degree of safety for the machine, and the output and at a cost negligibly greater than the cost of the same machine having plain bearings.

The Bowser automatic, continuous, oiling and filtering systems for dryer and calender rolls, Fig. 1, consists essentially of an overhead gravity tank A, feed main leading from this tank to the bearings a No. 12 sight-feed oiler (flow regulator), and overflow fitting at each bearing; oil circulating pump E. The overflow fitting is used to maintain a constant oil level in the bearing oil reservoir.

Operation of Lubrication System for Dryer Rolls

Refer to Fig. 1. Clean oil from the gravity tank goes to each bearing by gravity, the quantity of oil delivered to each bearing being regulated (set) at each No. 12 sight-feed oiler. The used oil from each bearing runs out of the overflow fitting into a common return main that carries the oil back to the filter. Here the oil is purified, cools off, and is returned to the gravity tank by the circulating pump.

The System Cools the Oil: There is usually a temperature drop through the filter of several degrees, frequently 14 to 20 degrees, insuring cool oil supply to the bearings.

How to Determine Size of System for Dryer Rolls

To determine the size of system for dryer rolls, box board, Fourdrinier, news and other similar machines, calculate the gallons per hour of oil to circulate, as per the formula below, and from Table I find the system number.

$$\frac{\text{Total bearing surface in square inches}}{20} = \text{gallons per hour}$$

(The bearing surface is the diameter in inches of the bearing or journal multiplied by its length; i. e., length of contact of journal with bearing.)

Example: A dryer has eighty bearings, each eight inches diameter by twelve inches length. What size Bowser oiling system is required?

$$\frac{12 \times 8 \times 80}{20} = 384 \text{ gallons per hour}$$

From Table I note that 384 gallons per hour falls between 250 and 450 gallons per hour in the table and therefore calls for system No. 7-E.

Referring to Fig. 1, the purpose of the tank alongside the filter is to provide room to hold all the oil in the gravity and oil piping, so that should the oil circulating pump fail, lubrication will continue for an hour or longer, the oil continuing to flow to the bearings until the gravity tank is empty. The oil feed connections at the bearings of a calender are shown in Fig. 5.

TABLE I.

Capacities of Bowser Oiling Systems for Paper Dryer Rolls.

Oil circulation, gallons per hour, required, as per Formula 1	Number of system
20 to 150	5
150 to 250	6
250 to 450	7-E

Pumps. But as the oil pumps are usually installed in duplicate, the chances of having any interruption of service of the oiling system and dryer are very remote indeed.

Where it is desired that the capacity of of the pump be considerably greater than the circulation to the bearings, and where intermittent operation of the pump is wanted, we use an electric float switch on the gravity tank, the switch automatically cutting in the motor when the oil level in the tank is at the predetermined level, and stopping the pump when the tank is full. We do not consider such a system as good as one wherein there is continuous operation of the pump. See Fig. 3.

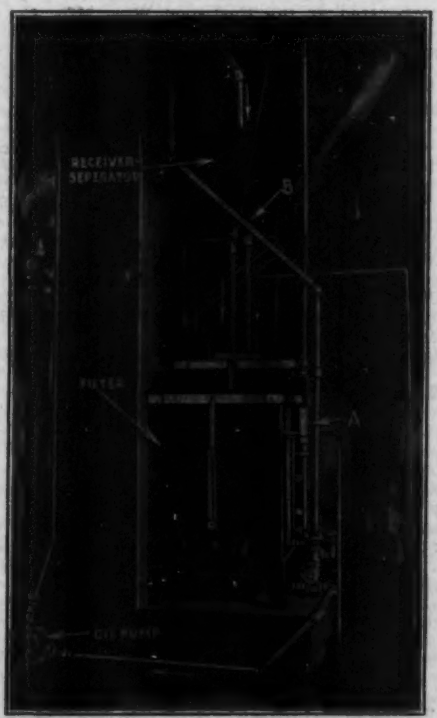


Fig. 4—Showing receiver separator, Type A filter, pump and connections on a calender lubrication installation in a Wisconsin mill

Circulation. For the usual dryer a circulation of roughly 2.5 gallons per hour per bearing proves in practice to give good results. When the dryer is first put in service and for about two weeks thereafter, it is well to feed all the oil to each bearing that it is possible to feed, for until the bearings are worn in, they tend to warm up. The liberal flow of oil carries away the heat.

Oil for Dryer Roll Bearings. Heavy oil, of 600 sec. Saybolt viscosity or higher, is invariable used. One of our most successful installations, that of the St. Lawrence Paper Mills Co., Three Rivers, Que., used oil of 1000 viscosity, sec. Saybolt, at 100 deg. F., and results are more satisfactory than when oils of 400 and 600 sec. viscosity, respectively, were used on the same dryer. The oil returns to the filter at 180 deg. F., and leaves at 114 deg. F. The viscosity at 180 deg. F. is judged from observation unaided by viscosimeter, about 150 sec. Saybolt. The rolls of this dryer weigh 4½ tons each and the speed is from 40 to 70 R.P.M. The bearings are not ring or collar oiled, but are adapted to stream lubrication. The engineers say that on all future dryers and calendars ring or collar-oiled bearings will be specified.

Location of Sight-Feeds. It is important to locate the sight-feeds high enough above the point of connection to the bearing housing to prevent backing-up of the oil in the sight glass when feeding fast. Two or three inches head is plenty.

Fig. 5—The oil feed connections to each bearing of this calender are shown in white

Locate all piping so it does not interfere with removal and replacement of the rolls.

Automatic Lubrication of Calendar Rolls Having Plain Bearings

We have three types of systems available, one a gravity feed, Fig. 3, the other a pressure system, and the third a force-feed by means of a mechanical, force feed, multiple-feed lubricator. All systems are highly successful.

The Gravity System. This consists of a tank overhead the calender with feed mains leading to the stacks and a branch with a sight feed (feed control) leading to each bearing. Simple pans to catch the oil from the bearings are provided, and the oil is returned to the gravity tank by an electric driven or steam driven pump, if desired, by a pump driven from the calender itself, whichever the purchaser prefers.

The Pressure System. The pressure system is exactly like the gravity system except that the gravity tank is omitted and pressure is maintained in the line by the pump. We believe the gravity system to be the safer of the two.

Force-Feed System. Our Model T or Model M mechanical lubricator is mounted on the calender frame, there being a feed for each bearing, and two extra feeds for reserve or emergency purposes. The lubricator is lever or belt driven from the calender and starts when the calender starts and stops when it stops. In starting, a hand-operated lever on the lubricator may be used to force oil to the bearings before the rolls are revolved.

We have many of these force-feed systems in use, and they prove economical as well as wholly reliable.

To give flexibility to the connections where the feed lines connect with the bearings, we often use short lengths of flexible steel tubing. Where pipe connections are not subjected to severe shocks and vibrations, we use our Union Cinch connections for all pipe joints. Every joint is then a union and only a monkey wrench and a hack saw are required to make up the connections. Where there are severe shocks and vibrations, we use the usual screwed fittings for connections.

All our lubricating systems of calender and dryer rolls, engines, compressors and turbines are so simple that the plant engineer, aided by our instruction sheets, can have his own crew complete the job. This avoids the expense of outside help.

When the Oil Contains Considerable Water

Sometimes the oil returned from paper mill machinery bearings carries with it comparatively great quantities of water. When this condition is met, we collect the oil directly from the bearings into our receiver-separator, which separates out the greatest part of the water, allowing the oil to go on to the filter, where the remainder of the water is removed. The receiver-separator and filter below the calender room floor level are shown in Fig. 4.

Gear Drive Lubrication

As high-speed gear drive more and more is applied to industrial machinery, it calls for continuous force-feed application of oil under pressure directly to the gears, and for continuous filtration if the life of the gears is to be as long as they may be expected to last. The lubricating systems we use are very similar to those for dryer and calender rolls. The gear usually dips three or more inches in the oil in the gear housing, the level in which is kept fixed by a vented overflow. A pump takes the oil from the housing through this overflow, and elevates it to our overhead gravity tank. There is a feed line from the tank to the top of the housing, and at this point two or more branches are taken off each leading, so as to direct one or more streams of oil under pressure directly onto the face of the gear. The stream is fed through our No. 5 Clear Vision Sight-Feed Oilers having sight-glasses two inches in diameter. The life of correctly designed and loaded gears so lubricated is indefinite.

Wires*

By G. B. BUCHANAN
Sec.-Treas., Appleton Wire Works

A NUMBER of years ago I attended an entertainment given jointly by James Whitcomb Riley and Bill Nye. At that time Mr. Riley had a heavy head of black hair, while Nye's head was as guiltless of hair as a billiard ball. Mr. Nye, in making his introductory remarks stated that he and Mr. Riley had been traveling together and appearing on the same platform for a long time, and that while they did not agree on all things there was one matter in which they were in entire accord; that was in the manner in which they wore their hair. Mr. Riley had all the hair, and he, Nye, had all the part.

This afternoon Mr. Watson and I appear on this program to speak on wires. Mr. Watson and I are also in agreement, but I have both the hair and the part, as Mr. Watson and I have agreed that I shall discuss this subject with you.

In a recent article by Frederick Simpich, who by the way was a former resident of Appleton, in The Nation's Business he makes the statement that while business may be slow it is never dull. We of us, who are engaged in different lines of business, I am sure can agree with this statement. I have just returned from a month's trip through the West to the Pacific Coast, and on this trip, I have talked with men engaged in many lines of business, and have gone through plants manufacturing various products. The skill and perfection attained in the various lines of industry is a constant source of wonder. Your business and mine is no exception to this amazing progress and development.

I have been asked to talk with you this afternoon regarding a product which is essential in the manufacture of paper. This is the manufacture of paper maker's wires, which includes Fourdrinier Wires, Cylinder Wires, Washer Wires, Save-all Wire, etc.

The history of the Fourdrinier wire industry in the United States covers a period of exactly three-quarters of a century. This is not a long period of time when we consider that many men now living were good sized boys when the first paper machine wire was made in this country. Previous to 1848 the comparatively few paper machine wires used in this country were imported from Europe, largely from Great Britain. In 1847 my grandfather, Robert Buchanan, came to the United States from Scotland to work at his trade of Fourdrinier wire weaving in a weaving shop then being built at Jersey City, N. J. The plant was about ready to begin operations when one night it burned to the ground, and this plant was not rebuilt.

The year 1848 marks the beginning of the Fourdrinier wire industry in this country. It was in this year that the William Cabble Excelsior Wire Mfg. Co., Brooklyn, N. Y., and also the Staniar & Laffey Wire Co. were established. Newark, N. J. was the location of the Staniar & Laffey plant.

In those early days the few Fourdinier machines in the United States required wires that were narrow and short. A wire 72 inches wide by 40 feet long at that time was considered a large wire. The speed at which these early machines ran was also very slow compared with the speed at which paper machines are now operating. I remember when the first loom was built to weave wires 100 inches wide, and this loom was a nine day wonder.

A Bit of History

During these 75 years, the paper industry has expanded and progressed by leaps and bounds. The manufacturers of Fourdrinier wires have exerted every effort to keep step with this progress and to meet these rapidly changing conditions, as to speed, width, stock, etc. The old wire weaving plants have increased and enlarged their equipment, and from time to time new weaving plants have been established. In the early fifties, William Stephens & Sons commenced the manufacture of paper machine wires at Belleville, N. J., this plant later becoming the De Witt Wire Company. In this weaving shop, Robert Buchanan worked as a wire weaver, and my father, William Buchanan learned the wire weaving trade. In 1876, Robert Buchanan with his sons moved to Holyoke, Mass., and established the Buchanan & Bolt Wire Co. In the same year my father left the employ of the De Witt Wire Co. and established the Centennial Wire Works at Bloomfield, N. J., with Charles Smith, a wire drawer. In 1878 this business was moved to Belleville, N. J., and Mr. John Eastwood was admitted to the firm. This business was conducted for several years under the name of Eastwood, Buchanan & Smith, and later incorporated as the Eastwood Wire Mfg. Co. A few years earlier. The W. S. Tyler Co. plant was established at Cleveland Ohio, and for many years The Tyler Co. was the manufacturer of Fourdrinier wires the farthest west. As the years passed, other Fourdrinier wire weaving plants were established in various parts of the country, and at the present time, there are in the United States about twenty manufacturers of Fourdrinier wires, which have practically all branched out from those I have mentioned.

Previous to 1896 there were no Fourdrinier wire weaving plants west of Ohio, The W. S. Tyler Co. being in Cleveland. In this year, the Appleton Wire Works was founded at Appleton by William Buchanan, his two sons, and his brother-in-law, A. W. Weissenborn. There are now five Fourdrinier wire weaving shops in Wisconsin, the other four being the Wisconsin Wire Works, at Appleton; Fox River Wire Cloth Co., Appleton; International Wire Works, Menasha; and the Green Bay Wire Works, Green Bay.

These several weaving plants were established in the order named.

The changes which have taken place in the paper industry during the life time of men now actively engaged in it are almost beyond belief; the changes in width and length of machines, in speed at which they are operated, and the new materials used for paper making, and the new methods of preparing the paper stock, have revolutionized the paper industry.

The manufacturers of paper machine wires have not been asleep at the switch, but have steadily perfected their machinery and methods of drawing and weaving wire, endeavoring to keep step with the changes which have taken place in the manufacture of paper.

I have had paper mill superintendents ask me why the Fourdrinier wire manufacturers do not make as good Fourdrinier wires as we did 20 or 30 years ago. My reply has been that we are making better wires today than we did a generation ago, and if the present day wires were run under the same conditions as to speed, stock, etc., as the wires were run at that time, the present day wires would give better service and satisfaction than the wires to which they refer.

It is not necessary for me in this company to speak of the great increase in speed at which wires are now run, the increase in suction to get the water out of the sheet more quickly, the wood pulp made from various kinds of wood used for stock, the clay and talc used for filler, etc. These and other changed conditions have made more severe demands on the Fourdrinier wire, which we Fourdrinier wire manufacturers have strained every nerve to meet.

Previous to the beginning of this century practically all wires were woven on hand looms operated by two weavers, the shuttle being thrown back and forth by hand. The hand looms have been gradually superseded by looms that weave wires which are smoother and of more uniform weave than the wires woven on hand looms. Today there is not a Fourdrinier plant of any importance weaving wires on hand looms. These modern power looms are of various types, but are all

*Presented at the meeting of the N. W. Division of the American Pulp and Paper Mill Superintendents' Association, at Appleton, Wis., October 26, 1923.

operated mechanically and controlled by one weaver. Our power loom, invented by our President and Manager, Mr. A. B. Weissenborn, is operated by compressed air, electrically controlled. Other types of looms are belt driven and operated by a cam.

Important Factors in Wire Making

There are many factors of importance entering into the manufacture of a Fourdrinier wire. One of these is the quality of the wire. The two metals used almost exclusively in the manufacture of Fourdrinier wires are low brass and phosphor bronze. The low brass is termed "tombac." The composition of this metal being about 80% best lake copper, 20% best Horse-head brand of zinc. The composition of phosphor bronze Fourdrinier stock is in the neighborhood of 90% copper, the balance being tin, and phosphorus being added as a cleaning agent and to assist in the amalgamation of the metals. Most mills find that wires made of all low brass give the best results. Other mills prefer Fourdrinier wires made of phosphor bronze warp and a brass shute as best meeting their conditions, while occasionally a mill prefer wires made of all phosphor bronze, both warp and shute.

The wire is reduced to the proper size for weaving the various meshes of wires by being drawn through diamond dies. These diamond dies are round discs of brass about 1 inch in diameter, in the center of which is set a small commercial diamond or bortz, through which a small hole is drilled which determines the size of the wire.

The drawing of the wire through the dies hardens it. Therefore it is necessary to anneal the wire before weaving, that the paper machine wires may be sufficiently soft and pliable to run on the paper machines without cracking. There are various methods of annealing wire; by gas, oil, electricity, and charcoal. We have always used charcoal for annealing our wire, as in our judgment the best results are obtained by this method of annealing wire for Fourdrinier wires.

One of the most important features of a wire is the seam. As a chain is no stronger than its weakest link, so a Fourdrinier wire is no better or more serviceable than its seam. As the speed of paper machines has been increased and various wood pulps and fillers have been increasingly used, the paper mills have demanded a seam that is strong; one which will resist the friction and wear of the suction box covers; a seam which will not fill up, and on which the lightest sheet will form with a minimum of seam mark. Years ago when machines were run at a much slower speed, when rag or rope stock was generally used, and there was but little filler, seam trouble was rarely known; but under present conditions seam trouble is the most frequent source of trouble, and this in spite of the most strenuous efforts of the Fourdrinier wire manufacturers to put seams in their wires, which will meet all of the various modern requirements.

In years gone by in the slow running machines with a smaller number of suction boxes, the shake of the machine would prevent the wire from scoring the suction boxes, but as the speed of the paper machines has been increased and additional suction boxes have been added to get the water out of the sheet rapidly, the wire has a tendency to freeze or hang to the last one or two suction boxes, which scores these suction box covers, and this scoring in turn gouges and cuts away the seam, causing the seam to break out before the full life is obtained from the wire.

Much thought has been given to the matter of overcoming this scoring of the seams. One method has been to weave paper wires slightly sinuous, so that the wire will have a slight serpentine motion when running on the machine. This is to prevent the wire from tracking and scoring the suction box covers.

Another method of overcoming this trouble is to equip the paper machines with oscillating suction boxes to achieve the same result of preventing scoring that weaving of the sinuous wires accomplishes.

All wire manufacturers have more or less seam trouble, and one of the mysteries of our industry is why several wires, one after the other, will give a good satisfaction and service and the seam not break out, while the next wire run, made of the same stock, woven in the same manner, and the seam so far as we know exactly the same will be gouged and worn away so that the seam will break out before the wire has given its full life.

Another factor of importance is proper stretching and packing of wires. The stretching rolls and beams must be large and strong that there may be no spring, and that the wires may be stretched square and flat and so run true on the machine and guide properly.

As the paper machine wires have become larger and heavier, the packing of them has become a greater problem, requiring larger and stronger rolls and heavier boxes. If these heavier boxes receive rough handling or are dropped on end from the freight car or truck, as is sometimes done, the liability of damage to the wire is vastly increased.

If the men who put on wires and who handle them in the mill, could see how they are made and realize the care the wire manufacturers exercise in weaving, seaming, stretching, and boxing them, it would no doubt make them more careful to see that the wires get on the machine in good condition and free from all breaks, kinks, dents, creases, etc., which of course tend to shorten the life of the wire on the machine.

It is always a pleasure to show visitors through our plant that they may see how wires are made, and I extend a cordial invitation to any and all of you to visit the Appleton Wire Works and see how Good Wires are made, for as you may probably know, "Appleton Wires are Good Wires." I am sure that Mr. John Watson, Manager of the Wisconsin Wire Works, would also be pleased to have you visit his plant.

Beaters and Beating*

By C. E. YOUNGCHILD
Paper Mill Supt., Nekoosa Edwards Paper Co.

THIS is quite a subject for a superintendent to attempt to cover, especially in a short paper; but I have been "ordered on" and try never to shirk a responsibility.

Beaters

There are many kinds of beaters, but the ones commonly used in the manufacture of pulp are the type I will touch upon in this paper. I use the word "touch" advisedly, because in a 10 or 15 minute paper I can even only do that but lightly.

Dr. Sigurd Smith, in his new book on "The Action of the Beater" does the subject justice; but his book has over 200 pages of print as fine as that in a newspaper. In his Preface he says in part:

"The complete absence of any theory of the action of the beater immediately made itself felt" when he was trying to design a small beater to do twice the work of existing designs. He says further:

"The complete inaccessibility of the actual beating zone renders it impossible to observe visually what takes place between the roll and the bed plate."

This difficulty has been experienced by all when trying to solve the problem of beating. It is a puzzle with no way of telling when it has been properly solved. In his Foreward, he says in part:

"The beater, as the pivot of the mill, and the beating preparation of the fibrous raw material, as the paper making operation, are recognized as presenting a number of unsolved problems with the attraction of unrealized margins of advantage, both as regards quality, qualities of product in relation to raw material and cost of production, values of papers in relation to expenditure on account of power, labor and upkeep of machinery."

No one can dispute Dr. Smith in his statements in this work. It is common knowledge that the beating process can make or spoil stock and exercises a very marked influence on the character of the finished product. If the stock has not been properly beaten, it cannot be made into the required quality on the paper machine. It is therefore, a fact that "paper is made in the beaters" that is, for all grades requiring beating.

Some want their stock thin and others heavy consistency; some want small beaters and others large ones; some call for quick action and large power use, while others think brushing and long time with small power use covers the bill.

Makers of beaters are a good deal like makers of paper mill machinery generally—they either don't know, or don't care to hurt the customer's feelings. They will usually make what is wanted, or claim their beater is a "cure all" for all ills. No two makers will make the same claims, however, for almost exact counterparts in construction except the name and paint on the outside.

My experience to be chronicled here is with the Jones type of beater, 1,600 pound size, as we furnish them, though I understand some mills furnish this same beater up to 2,000 pound dry weight. I have experimented with many types of fillings on various stocks; but chiefly on unbleached sulphite and sulphate, or Kraft stock.

Among the types of bars used were Helin, both wide and narrow, Dowd cluster, North and the common straight bar, all of them without the desired results, I have tried various speeds and bed plates but still without satisfaction, until, a little over a year ago, I tried a filling of my own design and it showed the best of any yet tried, using the North

*Presented at the joint meeting of Tappi and Superintendents at Appleton, Wis., October 27, 1923.

stone bed plate in conjunction therewith. Mr. B. T. McBain helped me with the idea and its application, and together we have applied for a Patent, with report from the Patent office that all our claims have been allowed.

For reasons which most of you will understand, on account of Foreign Patent rules, I cannot put a copy of claims or picture of the filling in this report; but as soon as the Patent has been issued, I expect to make the other applications necessary and then will be pleased to have complete details made public. Suffice it to say, however, that on hard Kraft stock to test point for pound or better on the finished paper, my filling has shown hydration of the stock in 25% to 30% less time and with no greater power requirements.

I have eight such fillings in use now at Nekoosa and four at Port Edwards. As fast as I can equip the balance of Nekoosa beaters, the work is being done. I find it to be of equal value on sulphite stocks. My filling can be put in any type of beater and the old bars now in use can be utilized. My improvement retards circulation some, still it increases the beating surface almost 100%.

The four beaters so equipped at Port Edwards, are of "Niagara" type and they show at 110 R. P. M. less use of power than those regularly equipped by the makers. My theory is a combination of hard and soft steel, by straight and shearing cut or brushing against a stone bed plate, and this theory has worked out to the great advantage of the Nekoosa Edwards Paper Co. as the manager and I, myself, see the results.

Our Chemical Engineer, Mr. Eagan, has made some preliminary tests to confirm these results and finds with the instruments he has, that there is the difference in hydration claimed. Further tests are being made at Port Edwards between the old type of bar in Niagara beaters at J. E. Mill and the new Alexander mill beaters of the same make. These tests were not completed at the writing of this paper; but after the issuance of the Patent, will be made public.

I truly believe that there is nothing under the sun in pulp and paper making but what can and will be improved, and that the beater is one place where not only the design, but the method of operation has needed more attention than has been given them in most mills.

I trust I have given you something of interest herein and that you will feel your time has not been wasted.

If you would know the value of money, try to borrow some.—Poor Richard's Almanac.

Paper Makers' Felts*

By A. H. THEURER
Supt. Appleton Woolen Mills

ONE of the most important phases in the manufacturing of machine clothing satisfactory for the exacting requirements of the paper industry, is the selection of our raw wool stocks. Our problem is somewhat simplified in that we use no cotton or wool substitutes such as shoddies, noils, garnetts, or waste of any description, confining ourselves to straight, virgin, wool.

While wool is wool, there is a vast difference in various types grown, each having its own characteristics. It may interest you to know that different kinds of soil, as well as varying climates in different parts of our country alone, affect the color, elasticity, and general working properties of the wool. For instance, wool grown in Wyoming has a much brighter color than wools grown in many other states, because of the soil, and is especially desired by knitters. Wools grown on cut-over land from some sections are not as choice as they might be, because the fleeces become more or less loaded with burrs and other vegetation while the sheep ramble thru the brush. Wools of another section have the characteristic spiral burr, which to the felt maker is very objectionable in that each individual burr breaks into a great many small pieces during the carding process, and is spun into the yarn as it cannot be satisfactorily removed. Many wools from still other sections are more stained in character, while the best domestic wools come from the central middle western states.

The principal characteristics which a good felt wool must possess are:

Length of Staple. The strong, coarse yarns require the longer coarser stapled wools, such as are used in the manufacture of wet machine felts, while medium grades of felt require a shorter and finer staple, and the fine super grades a still shorter and finer stapled wool.

Strong, healthy staple. Sometimes defective wools are offered which have a weak spot in the staple, indicating that the wool came from sick sheep. The so called cotted fleece is another result of sickness in the sheep, which causes the wool to become matted together and unfit for felt stock. It is such defective wools as these that we are careful to eliminate in the selections of our stocks, using only the strongest staple obtainable.

Evenness of Staple. Inasmuch as many different sorts can be made from one fleece, you may know how careful the wool must be sorted; for to obtain a strong, even yarn, free from lumps, the wool used in that particular yarn must be of uniform length.

Elasticity. The earlier or lamb wools are not only somewhat kempy, but have coarse tips and not enough blood or character, are not as elastic, and do not possess the proper fulling qualities essential in felt yarns; while other wools seem dead, possessing no loftiness or elasticity of any kind. To use such wools as these would be the height of folly.

Free Wools. That is, they must not possess spiral burrs or an undue amount of chaff, as this vegetable matter can only be removed by carbonizing. This process, however, makes the wool harsh and much less desirable for felt requirements. This is a very common characteristic of Australian, South American, and some other types of foreign wools.

Color. Good white wools are always preferable to stained wools, as the latter do not make as presentable a felt and are also apt to be weaker in staple. Therefore, in manufacturing each different grade of felt, we must select only such wools as are best adapted for the different grades of felts. Thus, by always buying the best grades of wools grown, we never find it necessary to hold any post mortems on account of off grades of wools, which we thought we might have slipped thru as a cheapener.

Having selected and graded our wools, our next care is to remove all animal oil or grease, sand and dirt, from the wool in order that it may be properly processed. This is done by scouring in a liquor especially prepared for this purpose. Care must be used for if the bath is too strong, the wool will become tendered and if too hot, become harsh, losing much of its elasticity. This is also true if dried at too high a temperature. If the stock is agitated too much, it becomes matted together, producing most unsatisfactory results in subsequent processes.

Following the scouring, the wool must be blended, that is, certain wools must be mixed together, so as to obtain the blend best suited for the particular grade of felts into which this yarn will go. In picking this blend, the mix is treated with a soluble oil so as to make the fibres more pliable and elastic, preventing the breaking of the staple in the following process.

Process of Carding

The carding of wool consists of a series of combings, the purpose of which is to comb out the wool fibres in order that they may be paralleled as much as possible. It is very necessary that this work be very carefully and thoroughly done, in order that the ends be all of uniform size and properly condensed. Each set is carefully weighed and must not vary over three grains on each fifty yards tested. Unless the stock is properly carded, it would be practically impossible for the spinning department to obtain the required effect in the yarn. As the ends come off the card they are wound on jack spools and then ready to be spun.

In spinning, the work is done on machines containing 360 bobbins, each bobbin taking care of one end from the spool, winding the yarn onto itself immediately upon each draw, receiving the required amount of twist. The twist of yarn is of the utmost importance, determining to a large extent the amount of stretch in the felts as well as the finish to be obtained. To secure a hard, strong yarn, such as certain kinds of felt require, the yarn must be twisted all it can, but not beyond the point of cracking the same. On the other hand, if a good soft, heavy cushion nap is needed, less twist must be put in, in order that we be enabled to properly raise the required amount of nap. The yarns are also tested for elasticity and breaking test, as each yarn must come up to a certain standard test, which we have determined as most satisfactory for each size of yarn made.

Following this process, the yarn is prepared for the weaving, being spooled onto large spools from which it is wound off onto the beamer in warp lengths and then transferred to the beams. Great care must be used to maintain proper tension in beaming in order to avoid any slack or tight ends, either of which would cause defects in the finished felt. After the ends are drawn thru the heddles, mounted on harness frames which control the pattern or weave, and thru the reed which maintains the proper position of the threads while weaving, the job is mounted in the loom, ready for weaving.

*Presented at the joint meeting of Tappi and N. W. Division of Superintendents at Appleton, Wis., October 11, 1928.

Weaving the Felt

The weaving of the felt requires the very closest kind of attention, in order to insure the proper texture at all times. Some irregularities may not show up until the felt is finished, causing the felt to be rejected on its final inspection. In such cases we always assume the felt will make better blankets than paper. The operator must be constantly on the alert for irregularities which might result in slack edges, cockles, variations in width, etc. This is true whether we weave them endless or otherwise.

The felts when woven go to the splicing and buring departments. The splicing of felts is a most exacting process and can only be done by skilled workers. The fabric is then carefully inspected so that every misweave, broken thread, or other irregularities may be corrected before fulling.

The fulling or felting of felts is far more exacting than one might think. When you know that felts are woven double the finished width or better, you will appreciate something of the exactness with which this work must be done. Notwithstanding this enormous shrinkage, of approximately fifty per cent, the felt manufacturer is required to finish down to ordered width, being allowed a three inch variation over this size. If the felt is under the size specified, it will not fit the machine for which it was intended and if more than three inches over width, it is necessary to refinish, getting the felt down to the proper width. Therefore, when we are requested to finish a felt one inch wider or narrower, you may know that you are not giving the felt maker the easiest kind of a problem. In fulling, the felts must be wet up a certain amount, and run at regular speed under as near a certain estimated temperature as possible in order to get best results. After being properly washed to remove the oil and dirt, thoroughly rinsed to remove all trace of soap, and extracted, the felt is ready for the finishing process.

Finishing

The finishing consists of stretching and drying the felts on a steam heated cylinder under a required tension, so as to properly finish to the exact width and length. It is here that any imperfections show up, as the felts are given a most thorough inspection during this process. If the felts are to be singed or napped, this is done and then carefully wrapped and sent to the stock room.

Each felt is covered by a complete record, showing not only the exact lots of wool used, but also all operators working on the felt as well as time required and condition of felt in each stage of processing. This record is indispensable in case any changes are desired at any future time.

At the request of your Mr. McBain, let us take up a few points on the care of felts after delivery to the mill.

Felts as you know, should be kept in a clean, dry place. Clean, because the moths and even rats attack soiled felts quicker than clean ones, and dry, to prevent mildew. Even although securely wrapped, mildew will destroy the felt if placed against a stone or brick wall for a period of time. An experiment proved to us that felts securely wrapped and kept in a clean, dry, well lighted room, collected no moths over a period of many months, even though they had no napthaline flakes in them. The flakes, however, if changed from time to time, are a good preventative. In some store rooms, felt bundles are slipped into canvas bags and tied, affording double security against moths.

Even in the felt mill, great care must be used to see that the felts are not torn in catching onto rough objects in being taken to and from the stock room. Within the past week, while moving a machine part through one of the departments, a sharp edge of the same caught a bundle of felt in such a way as to cut it.

Grease from journals and bearings cause spots which may give trouble later on in crushing at this spot, as the stock will collect here, causing the felt to fill up.

The cause of felt troubles may be classified under two heads: Chemical and mechanical.

Under the first we find deterioration most rapid at high temperatures. This is especially true when washing felts. Should the change of temperature be too great, shrinkage results; if too strong a chemical or soap be used, the felt will also be injured. It has been proven that a felt run straight through will produce a greater tonnage than one run at irregular intervals, as the slow drying out and standing of the felt on the machine shortens the life to a greater or lesser degree, especially should there be any press rolls which have not been lifted from the felt. It is for this reason, therefore, that the felt maker as well as the paper mill superintendent is interested in the actual tonnage produced rather than the time put on and taken off, for it is the tonnage cost which determines the actual cost of the felt to you.

An example of injury to felts from chemical action came to our attention some time ago, when we were called to see a felt which had gone to pieces; and when we saw it, there was no mistake in our minds as to whether or not it had, for it was literally in shreds. At our request, two other makes of felts were put on with like results, proving the trouble to be local, either chemical or mechanical. To make the story short, it was found that the stock had not been properly neutralized, with the attendant result that the acid in the furnish caused the felt to go to pieces within a few days after being put on.

It is a well known fact that deterioration is much quicker in summer, not only because of warm water being used, but also because of vegetation in the water which decomposes, rotting the wool fibre in the threads, this being all the more rapid where unfiltered water is used, for under such conditions the felt will fill up much more quickly.

Mechanical sources of trouble are many and may be classified under two heads: Excessive tension and abrasion.

Were it possible to record the actual tension on felts, we feel certain that they would last longer, for this test would show when the tension was becoming excessive, making it possible for you to relieve the condition. The more rolls a felt travels over, the greater the tension, as the felt must act as a belt. Therefore, the necessity of seeing that all bearings are operating as smoothly as possible. This is very apparent on boxboard machines where as many as five, six, and seven cylinders are in operation, all of which are propelled by the felt.

The added stress of the whipper is an additional strain to contend with, as is also the case with suction boxes, which act more as a brake upon the travel of the felt.

The wear due to abrasion is an equally important factor. The whipper, should it become worn or roughened in spots, as is the case with wooden ones or from loose screws or nails, has its apparent results. Rough spots on rolls soon cut or chaff the thread, while the tops of suction boxes shear the nap on such portions of the felt as travels over the roughened part of the boxes. Occasionally we see a used felt which has a light streak worn clear around the felt, running in a straight line, indicating that undue pressure or wear was brought to bear against the felt at that point. These annoying troubles appear so suddenly at times, that it requires the most constant vigilance in order to avoid any serious loss of production or damage to your machine clothing.

The proper crowning of rolls, which is a very familiar subject to you all, has its effect upon the successful operation of the felt.

A complaint received at one time, was of a felt being satisfactory on one side of the center of the felt but not so on the other. An examination showed the pressure on the back side of the felt to be greater than on the front. Equalizing this removed the difficulty.

Conclusion

In conclusion, let it be said that while the history of felt manufacturing is one of progress, the industry is very anxious for greater accomplishments so that we may serve you even more effectively. This is being made possible through the splendid co-operation extended to us, not only by the individual superintendents but through the concerted action of the different associations.

That this pays good dividends is proven by the fact, that the best results in the paper industry are obtained in mills where the best co-operation is received, for it is in this way that the felt manufacturer can best determine the exacting requirements of each individual mill.

The industry therefore urges you to avail yourselves of its service in every way you can, and assures you it welcomes your hearty co-operation as a means of serving you with an even better felt.

Use of Laboratory Control Methods in Grinding*

BY LYMAN BEEMAN

Superintendent of Groundwood Dept., Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.

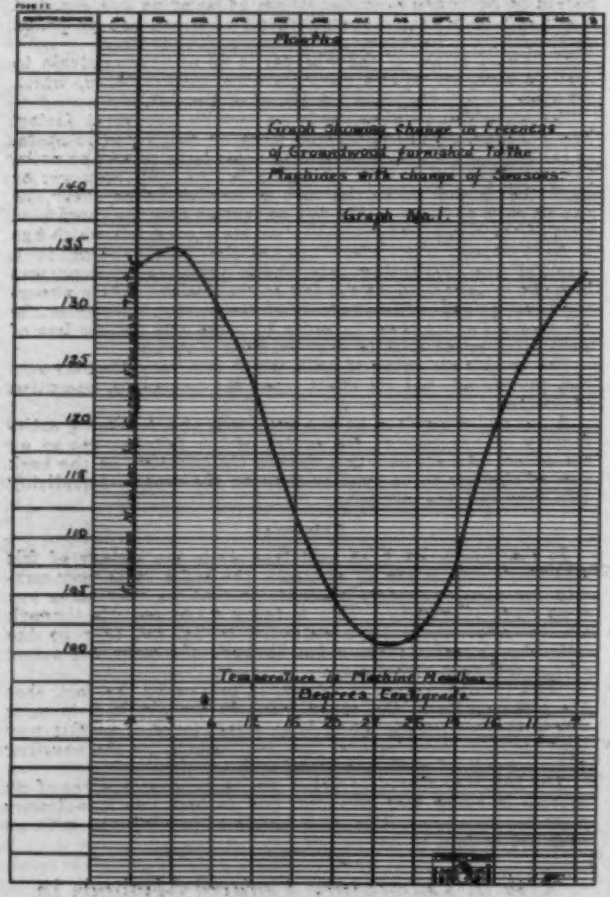
THE USE of laboratory control methods in grinding has been a fairly recent development in the operation of groundwood mills. It has been a part of the rapid growth in recent years of pulp and paper technology. When control methods are spoken of, it is naturally assumed that some avenue of information as to the facts has been provided to make possible the most efficient and desirable supervision of the operating units. This, then, is the basis of grinding by

*Presented at the joint meeting of Tappi and N. W. Division of Superintendents, at Appleton, Wisconsin, October 27, 1923.

laboratory control—to learn quickly and accurately the facts in regard to the product of the grinders, and to use these facts in sustaining or correcting the output.

The old so-called "practical" methods of operating grinders by the feel and looks of the stock and the running conditions of the stones are very effective when used by an experienced pulp maker, but lack the quality of numerical expression, which is so essential to keeping of records and to standardization of operating conditions. The use of these vague and uncertain practical methods can by no means be abandoned with benefit, but rather should be used to supplement the more definite and reliable numerical indication of quality, which such a test as the freeness test gives.

The most common and familiar method of measuring the quality of the stock which a stone is producing, is by the use of the freeness or sedimentation test. Although the strength test on hand sheets of groundwood gives some indication of the stock quality, the freeness test may be said to be practically the only test of any wide use or importance. It is the use of this test that we will consider. Other tests such as examination by the blue glass, the microscope, or the lantern slide give some indication of quality but do not lend themselves to routine work or to numerical expression. The blue glass is the most simple, and we sometimes use it if some further information about a stock seems desirable.


Graph Showing Change in Freeness of Groundwood Furnished to the Machines with Change of Seasons
Graph No. 1.
Temperature in Machine Headbox Degrees Centigrade

Graph No. 1

The problem of control may be approached from two angles; first, the control of the aggregate volume of stock going to paper machines, or second, to the control of the individual stones producing the stock. By controlling the freeness of the aggregate volume going to the machine, the pulp mill may serve the paper mill to the best possible advantage and by controlling the individual stones, the pulp mill may grind with the greatest efficiency. These two phases of control naturally go hand in hand.

Chart Showing Freeness Curve

With the object of delivering a stock of uniform freeness to the machine chest, the groundwood as it enters the measuring system is sampled and tested every hour, the results being then posted on the testing station log sheet, and on the chart on the grinder room bulletin in board in the form of a freeness curve. Three of these bulletin board sheets are shown in Charts Nos. 1, 2 and 3, just as they were taken from the bulletin by the testing station operator and filed. Chart No. 1 was made on May 4, 1923, during the spring grinding season when the stock was being produced, at 100 to 110 freeness. Chart No. 2 was made on July 24, 1923, when practically all of our consumption was being ground but at a freeness of 90 to 100. Chart No. 3 was made on October 12, 1923, when nothing was being ground, all the pulp coming from storage and from cars from the Canadian shipper and the machines being furnished with stock at a freeness of 120 to 130. It will be noted that in Chart No. 3 the freeness was much less uniform, the control being more difficult.

From these three charts, it can be seen that at different times of the year the groundwood furnished to the paper machines varies as to freeness, on May 4 the desired freeness being 100 to 110, on July 24 being 90 to 100 and on Oct. 12, being 120 to 130. This change in furnish is necessary because of the great change in temperature in the head box of the machine, the temperature varying from 3° C. in February to 28° C. in July, making a very great difference in freeness effect on the wire. In Graph No. 1 can be traced the general trend of the desired freeness with the change in temperature caused by the change in seasons. There is no effort of course to hold the stock at some pre-determined point, such as might be drawn up in advance, but rather the effort is made to follow the machine conditions and provide as nearly as possible the stock that will run the best. This graph does not show exactly what we have done in the past year or what we intend doing the coming year, but rather shows the general tendency of the fluctuations, the conditions of the moment determining minor irregularities of that moment.

The use of the hourly test is not only valuable as an aid to holding a uniform stock with the gradual changes occasioned by the seasons, but it is also an important aid in indicating and helping to hold quality with the grinding of inferior woods such as balsam, poplar, and jack pine or with the reducing of the sulphite content of the paper. This test gives reliable facts in a numerical way so that when some change is made or some improvement is being developed in the handling of the stock a definite means of observation is provided.

The second angle from which the problem of control may be approached, the control of the individual stones producing the stock is complicated principally by the very great difference in quality and properties of stones. This difference can hardly be appreciated until one has the opportunity of watching the performance of a group of stones by means of the freeness test. Although it might be readily accepted that different quarries would produce different products, but that stones from the same quarry and supposedly from the same ledge, should be so different is rather astonishing. It is this difference that makes it so important to observe and handle the grinding units by the aid of some definite test, such as the freeness test. If at some time an artificial grindstone can be made which will be uniform and standard, then it will be possible to standardize burring, grinding temperature, etc., with the expectation of obtaining a standard pulp.

Difference in Grinding Stones

There seems to be two general kinds of grinding surfaces; first, one in which the grit holds its cutting edge and gradually roughens until it is making a very free pulp, and second, one which does not hold its cutting edge but gradually falls off in production continually making a slower pulp. Although the first kind of surface seems to be more prevalent in English stones and the second more prevalent in domestic stones, it can hardly be said that the holding of the cutting edge is typical of English stones. The point is that one can draw no general conclusions, but must observe and handle each stone as an individual with its own particular properties.

The samples for the freeness test are taken from each grinder between seven and eight each morning, by the grinder room foreman or under his direction so that he knows the conditions at the time of sampling. The test is made immediately in the testing station and posted on the grinder room bulletin, beside the chart of the hourly freeness at the measuring system, and beside the chart showing time of last sharpening of each stone. The sampling and testing of the grinder stock at the beginning of each shift is good in a small mill, but rather cumbersome and unnecessary with a larger number of grinders.

To supplement his practical observation and knowledge, the grinder room foreman has before him with this method, a numerical expression of the quality of the stock going to the machines, the quality of the stock from each stone and the time that each stone was last sharpened or dressed, and is in a position to handle the stones with the best possible results.

The free cutting stones are sharpened with a finer burr than the others, and if any stone is cutting very free stuff it is either run over lightly with a fine diamond No. 12 or No.

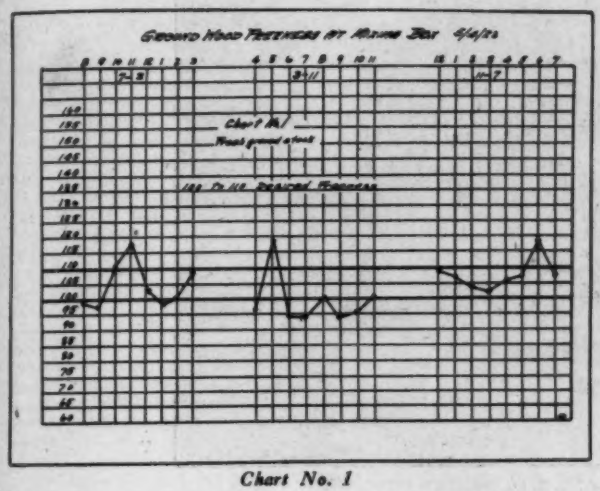


Chart No. 1

14 or is dulled with a piece of iron. The stones which have a tendency to drop off in production quickly with a drop in freeness are sharpened with a coarse burr. With the object of keeping all the grinders making about the same grade of

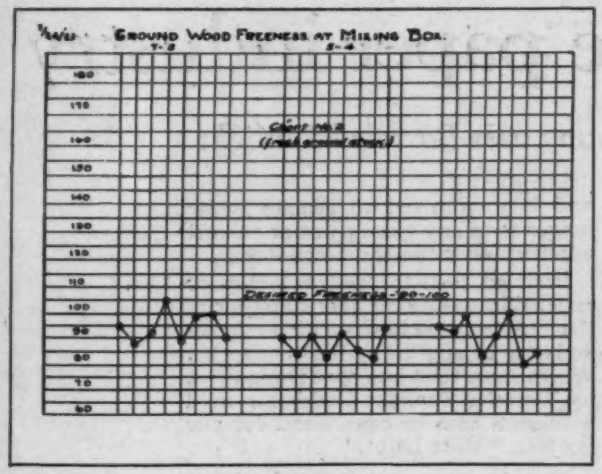


Chart No. 2

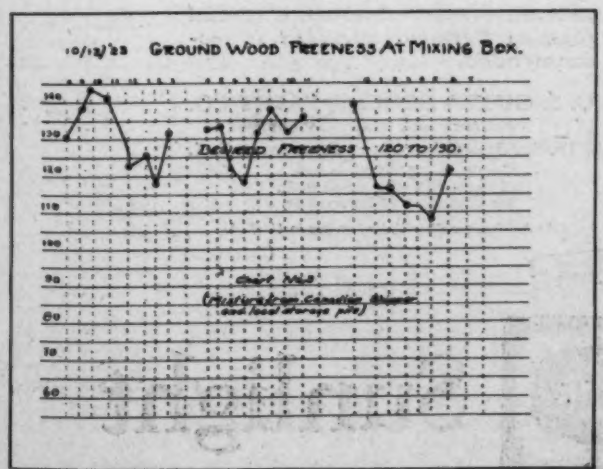


Chart No. 3

stock rather than having some running high and some low in freeness, the stones which have tendency to roughen up are dressed to keep the freeness down, and the stones which have a tendency to smooth off are dressed to keep the freeness up.

The grinding surface has so much more influence on quality than has temperature or pressure, that nearly all the attention is focused on the stone surface. Although the temperature is reduced occasionally to bring the freeness down on some stones, in general the effort is made to hold it 50° to 60° C. The pressure is out of control because of the fluctuations in power, and the grinding surfaces must sometimes be modified to hold the quality, with changes in pressure.

The object in building up a system for controlling the grinding has been to avoid elaborate testing or complicated statistics, but to have one simple reliable test by means of which the attention could be focused on the one important variable within control, the grinding surface. The kind of wood and the condition of the grinding surface are the things of primary importance, with the temperature, speed and pressure entirely secondary in importance in determining quality.

Water Wheel Grinders	Electric Grinders
No. 1—102	No. 1— 94
2— 90	2—107
3—132	3—164
4—114	4—134
5—180	5—120
6— 98	6—125
7—104	
8— 96	Average 124
9— 86	
10—106	
11—134	
12—124	
13—108	
14—145	
15—120	
16—105	
17—115	
18—110	
19—102	
20—108	
Average 114	

A Typical Test on Individual Stones

Coloring of Paper*

By KENNETH KING
DuPont de Nemours Co.

VARIOUS papers on coloring have been read before this Association during the past four years, the subject matter for the most part being of a general nature, with respect to the selection and application of various groups of dyestuffs to different grades of paper. Very little attention has been paid in these papers to the use of individual dyestuffs.

The technical department of a dyestuff company can classify its work into three groups; namely,

First, research or development work, together with the practical application of this work in the mill.

Second, matching of shades, using the laboratory as an aid for practical matching in the mill.

Third, helping to correct difficulties with respect to the use of dyestuffs in the mills.

In going over the color problems which the various mills have brought to our attention, we find a marked similarity in the difficulties encountered. A great many of these differences are due to the incorrect manipulation of certain individual dyestuffs, on account of characteristic properties they may have.

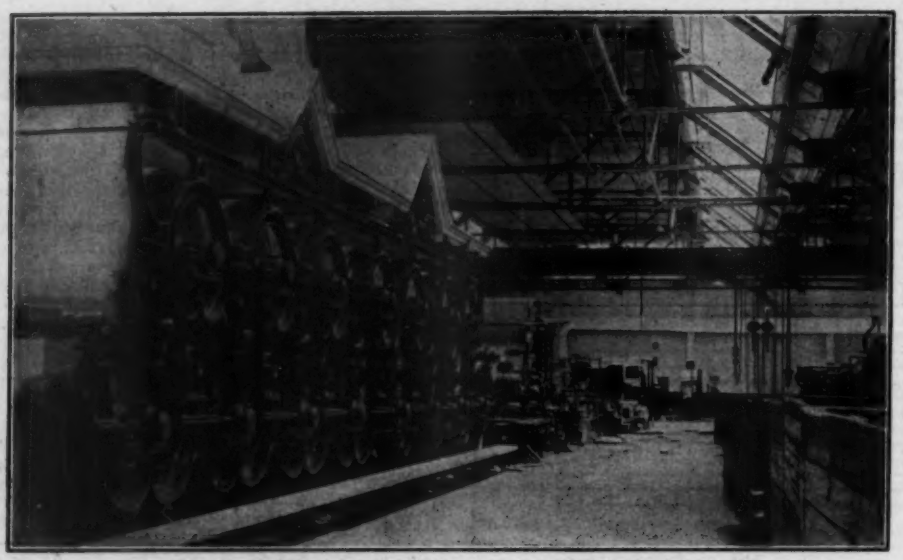
Rather than discuss the dyestuff question in general, this paper will be devoted to a discussion of the properties of certain dyestuffs or groups of dyestuffs which are used extensively in the paper industry, and which have been the most general causes for trouble.

Basic colors, as a class, should never be dissolved at a temperature above the boil. If live steam is used in dissolving basic colors, there is a chance that the strength of the dyestuff may be reduced as high as 30%. If, upon allowing the dyestuff solution to stand after boiling by the use of live steam, an oily or tarry mass rises to the surface of the solution, it is proof that a certain disasssociation has been produced by the steam.

Correct Way to Dissolve Dyestuffs

This trouble can be avoided by dissolving basic dyestuffs

*Presented at N. W. Division of American Pulp and Paper Mill Supts. Ass'n meeting in Appleton, Wis., October 26, 1923.



INTERIOR CUMBERLAND MILLS PLANT, S. D. WARREN COMPANY

Chosen by one of the finest mills in the paper industry

Why the S. D. Warren Company uses Barreled Sunlight

Keeping the interior clean and white without frequent repainting —that's one of the big problems every paper mill meets today.

The photograph above shows how successfully the great Cumberland Mills plant of the S. D. Warren Company has met this problem by the use of Barreled Sunlight.

Barreled Sunlight is a white paint that produces a surface so smooth that it resists the finest particles of dust and dirt. It keeps its light-reflecting qualities and even after years of service it can be washed clean like white tile.

Barreled Sunlight means more light, better working conditions and a cleaner looking plant—at the lowest cost.

Made by our exclusive Rice Process, Barreled Sunlight contains no varnish and is guaranteed to remain white longer than any gloss paint or enamel applied under the same conditions.

Barreled Sunlight will not chip or scale. Withstands the shock and jar of the heaviest machinery. Flows freely and may be applied by brush or spray. Where more than one coat is required, use Barreled Sunlight Undercoat. Sold in barrels and in cans. Send for our booklet, "More Light."

For beater rooms and places where excessive steam and heat prevail, Chemic Enamel, a special form of Barreled Sunlight, is recommended.

U. S. GUTTA PERCHA PAINT CO.
Factory and Main Offices
31 Dudley Street Providence, R. I.
New York—350 Madison Ave.
Chicago—659 Washington Blvd.
San Francisco—38 O'Farrell St.
And 100 other distributing points in U. S. A.

"Save the surface and you save all"—Paint Truth

Barreled Sunlight

THE RICE PROCESS WHITE

in the following manner: Heat the water to a boil, and then sprinkle the dyestuff into this solution with constant stirring. The dyestuff will go into the solution more readily than by shooting live steam into the solution containing the dyestuff, and clotting is avoided in addition to the guarantee that the strength of the dyestuff is not decreased due to the disassociation.

There are three exceptions to the above rule in the dissolving of basic dyestuffs; Auramine, Victoria Blue and Basic Browns should never be dissolved in water over a temperature of 160°F. In fact, in the case of Auramine, the temperature should not exceed 140°F.

Theoretically, approximately 40 parts of water should be used in dissolving one part of basic dyestuff. In practice, the best general rule to follow is never to have less than 80 parts of water per part of dyestuff. In other words, approximately one pound per ten gallons.

In many mills using the basic blues and violets for tinting, the dyestuffs are found to crystalize out of solution along the sides of the tank. This difficulty may sometimes be corrected by the addition of acetic acid to the dissolving water before the dyestuff is added, but in case acetic acid will not correct this difficulty, it is a direct sign that the dyestuff is in too concentrated a solution.

Basic dyestuffs should never be allowed to stand in solution for more than 24 hours, because after that length of time hydrolysis takes place to an extent of weakening the solution as high as 20%.

Auramine is hydroscopic in character, and if kept in a very damp place may absorb to as high as 15% of moisture. For this reason, Auramine, more than any other dyestuff, should be kept in storage where atmospheric conditions are normal, these being the conditions under which it is standardized.

Whenever a complaint is made concerning the standardization of Auramine, our first step is to weigh the contents of the keg or barrel, compare this weight to the gross weight marked on the barrel, and it is usually found that where pound for pound the strength of the dyestuff is supposedly reduced, the gross weight of the barrel has increased in practically the same proportion.

Chrysoidines and basic browns require alum to develop their shade. Due to the heat of the dryers, a sheet of paper colored with Chrysoidine will appear redder as it comes off the machine than it will be five minutes later. This point must be watched in matching a new shade, so as to not act too quickly in changing a formula in case the paper first run over the machine is a trifle red.

The chief difficulty in using any of the basic violets, is that the paper colored with them is decidedly redder under artificial light than in a natural light. For this reason it is harder to hold a shade with Methyl Violet during the night than with any other basic dyestuff. If the mill is equipped with a daylight lamp, a good policy is to use the lamp both during the day, as well as at night. Practically no trouble is ever experienced with any of the other basic dyestuffs, provided the general directions for dissolving are followed.

Acid Sizes

Acid colors differ from basic colors in the fact that they may be dissolved at a boil. Approximately half the water is required to dissolve them as is required by basic dyestuffs, and they are practically unaffected in shade by the heat of the dryers. More trouble is experienced, however, with Metanil Yellow, belonging to this group, than with any other dyestuff used in the paper mills.

Metanil Yellow is very sensitive to excesses of acid or alum, this sensitiveness being accentuated by heat. This dyestuff is the most economical to use for the manufacture of yellow shades of container liner, but unless certain points are closely observed, it is practically impossible to hold a uniform shade on this type of stock. It is common practice in the board mills to use excess of alum as well as to heat up the liner stock to temperatures ranging from 100° to 110°F., which is good practice, to 180°F., which is very poor practice. In having the temperature of the beater excessively over 110°F., not only is the shade of the board decidedly deadened, but the sizing is also decreased, and the strength of the stock reduced. In other words, if enough alum is used for sizing purposes and the temperature of the beater be kept at the correct degree, no trouble with Metanil Yellow should be experienced, but in case the shade of Metanil Yellow is deadened, the superintendent should look further to see the sizing qualities of his board, for the Metanil Yellow acts as an indicator on this point.

Acid colors are the most satisfactory for calender coloring, but for this type of work the most highly concentrated brands obtainable should be employed for the following reason: Reduced brands of acid dyestuffs are diluted with salt, and the salt solution when impregnated into the surface of the sheet of paper will naturally decrease the sizing qualities.

This point is also applicable to the use of concentrated brands of acid or direct dyestuffs in the beater, for here again the salt used in diluting reduced brands has a deteriorating action on the size. Practically no other trouble is experienced with the acid dyestuffs, with the exception of trouble from two sidedness and foaming.

Foaming may be decreased by the use of slight excesses of alum and by decreasing agitation of the stock to the minimum. If such methods are not satisfactory, the introduction of a small amount of Turkey Red Oil or a mixture of linseed oil and ammonia will decrease the foaming. The use of kerosene is to be avoided, because it acts as a solvent for free rosin in the size and will appear on the machine by gumming up the press rolls.

Two sidedness is a question too paramount to discuss in a paper of this type. Our research department is working on this problem and within the next few months we hope to have information which will be of decided advantage to all the mills.

In the coating mills, acid dyestuffs face the problem of fastness to alkali. This problem resolves into a careful selection of just which dyestuffs should be used for each coating formula.

Direct dyestuffs, like acid dyestuffs may be dissolved at a boil, though continued boiling is not a good practice. Alum has the property of dulling all direct dyestuffs, which explains the difference in shade obtained on sized and unsized papers.

On mixed furnishes, trouble is often experienced due to granite fibres appearing in the sheet. This can be avoided either by adding the dyestuff in very cold dilute solution, or by adding it dry to the beater.

As explained in the use of Chrysoidine, certain direct dyestuffs are much redder in shade, due to the action of heat and alum when first they come off the machine, than after the paper has assumed atmospheric conditions. Direct dyestuffs that act in this manner are very seldom recommended for use in the paper mills, because other direct dyestuffs, which do not act this way, can be used to obtain the same shades at approximately the same cost.

Heat Losses in the Machine Room*

By E. P. GLEASON
Chief Engineer, Nekoosa-Edwards Paper Co.

IT HAS been previously pointed out that steam power constitutes about 36% of the conversion cost in the average paper mill, and is the largest single item, exceeding labor by 10%. The largest use of steam is in the machine room, and this paper will be confined to heat losses in this department. The writer has recently had the pleasure of visiting many of the large mills in the eastern United States and Canada and was particularly interested in this subject.

Heat Loss in Piping and Dryers

Steam in the machine room goes through engines or turbines or direct through reducing valves to the dryers and air heaters. It will surprise you to go through good mills and note: (a) uncovered steam pipes both live and exhaust, (b) leaky steam joints and pipe threads, (c) exhaust blowing to atmosphere either constantly or during washing up periods, (d) machine dryers shut off, causing increased steam pressure for drying paper. This means greater back pressure on the prime movers, with loss in efficiency as well as poor speed regulation.

You can see the above losses. But you *cannot see* (e) broken syphon pipes or buckets, (f) machines that are blowing through to hot well to get circulation, (g) leaky valves and traps, (h) clean condensate used for process work where it should be returned to the boilers. All of these are serious and deserve the best attention of the superintendent and engineers.

The modern mill does not allow any steam to blow through to the hot well. All steam traps and valves are periodically checked to insure their being tight. Circulation in dryers, removal of air and the very important item of graduated temperature from the wet end to the dry end of the paper machine, is obtained by a J. O. Woodsome or similar circulating system. It is not uncommon to see a machine that formerly carried 10 to 15 lbs. steam pressure on all dryers, doing better with a graduation of from 10 inch vacuum at the wet end to 6 lb. at the dry end, with maximum quality of paper and minimum steam cost.

We predict that in the near future all machines will be equipped with separate steam flow meters measuring the steam to driving units and dryers. In the case of Yankee machines, this meter should include the steam to hood air

*Presented at N. W. Division of American Pulp and Paper Mills Supts. Ass'n meeting in Appleton, Wis., October 26, 1923.

Picture of a Paper Manufacturer who has an Inefficient Beater Room

There are many like him in the country throwing profits away every day, due to inefficiency in their beater rooms. The trouble is the result of numerous causes, among them beating equipment that consumes more power than it should per ton of stock produced. Overcrowding is another difficulty; equipment that requires too many men, too much care and repairing and that ties up too large an investment.

How to Increase Beater Room Efficiency

All of the above difficulties can be overcome with the installation of Niagara Beaters. One Niagara often does the work of two or three Holland Beaters. Niagaras consume less power per ton of stock produced; they use less floor space, require fewer men to operate them, are easier to care for and represent a smaller initial investment for a given capacity. We will be glad to furnish further particulars regarding Niagara Beaters, proving all of the above statements. Write for them today.

VALLEY IRON WORKS COMPANY

Plant: Appleton, Wisconsin **New York Office: 350 Madison Ave.**

heaters. Separate meters should be used for steam used in heating, thus separating heating and process steam costs.

Air Heat Losses

Under present conditions there are three classes of machine rooms: (a) the open room, (b) the room with hoods over the machines, (c) the latest development where the dryers are entirely enclosed with the exception of the front side.

The Open Room. There are still some machines in open rooms and there are still some misguided advocates of this practice, but we believe we are safe in saying that there is no excuse for this practice in the light of modern engineering and experience.

The Hooded Machine is accepted as standard today and except for the heat losses has been very satisfactory, especially where it is built of insulating material and where the air supply is properly laid out.

There has been a recent tendency toward open pits in which the bottom felt is cooled and aired. This practice is questionable, and recent tests have shown a decided cooling of the paper on each bottom dryer and a heating up at each top dryer, where there should be a gradual increase in temperature throughout the machine. The remedy is more felt dryers and the introduction of warm air in a closed pit.

The Enclosed Dryer Unit. This has been successfully tried in several cases and its value proven. The usual practice is to build a roof over the dryers extending down to the top front frame and back to the wall. The ends are closed. The pit is closed. Air comes from the pit and from the room and all air goes through the machine from front to rear. It is then taken out through economizers where maximum heat recovery is made.

Advantages of the Closed System are:

1—A clear dry room.
2—Maximum comfort for machine crew.
3—Minimum depreciation of machine building.
4—Lower drying cost due to less volume of air required.
5—Lower economizer cost, if economizers are used.
6—Increased production—about 10%.

Disadvantages of the Closed System are:

1—Higher cost of hood.
2—Space back of machine is closed in and is too hot to work in while running.
3—The question of uniform drying across the sheet with all air passing through dryers. This does not appear to be serious in actual practice. As the air travels across the dryer fan, it is heated at the same time that it is picking up moisture, and with proper control the absorption can be made practically uniform.

The Yankee is another type of a closed dryer machine.

The following example will illustrate the three types of Machine Rooms:

A machine making thirty tons of paper in twenty-three hours will evaporate 87 lbs. or 609,000 grains of water per minute with 69% moisture to dryer and 8% from dryers.

MACHINE DATA

Item	Name	A Open	B Hooded	C Closed
1	Temperature of air leaving...	105° F.	120° F.	140° F.
2	% saturation of air leaving...	70	90	90
3	Carrying capacity of air Gr. per lb.	248	512	965
4	Moisture in incoming air (80° F., 40% R.H.)	62	62	62
5	Air can pick up (Gr. per lb.)..	186	450	903
6	Lbs. min. air required.....	3,270	1,350	675
7	Total B.T.U. per pound.....	66	112	195
8	Total B.T.U. per min. leaving machine	216,000	151,000	131,500
9	% saving over open room.....		30%	39%
10	% saving closed machine over hood			13%
11	Dollars per year saving over open room		$12,500.00	$16,400.00
12	Dollars per year saving over hooded machine			$ 3,900.00

The above figures show a 30% saving of the hooded machine over the machine in an open room and a further saving if the dryers are enclosed. Average conditions have been taken in this example. It is understood that conditions will vary somewhat in each mill. These figures are for machines only.

Conclusion

The open machine shows large losses and the closed machine shows decided saving over the hooded machine.

The economizer savings are large and warrant its general adoption.

The combination of the closed dryer and the economizer give the lowest drying cost.

The proper use of the economizer manufactured by J. O. Ross Engineering Corporation and applied under Briner and Alexander patents will effect further savings as follows:

Economizer Design Data from J. O. Ross Engr. Corp.

Item	Name	A Open	B Hooded	C Closed
1	Total air to economizer, lbs....	3,270	1,350	675
2	Temp. fresh air to economizer..	30° F.	30° F.	30° F.
3	Temp. fresh air to economizer..	85° F.	90° F.	90° F.
4	Temp. Exh. air from economizer	87° F.	95° F.	100° F.
5	Total B.T.U. to economizer.....	216,000	151,000	131,500
6	Total B.T.U. removed from economizer	43,100	60,700	78,900
7	% heat recovery.....	20%	40%	60%
8	B.t.u. required for lb. of air....	13.2	14.4	14.4
9	Lbs. min. heated air.....	3,270	4,220	5,480
10	Cu. ft. per pound.....	13.75	13.86	13.86
11	C. f. m. heated air.....	43,500	58,500	75,900
12	Equivalent steam recovered, lbs. min.	43.1	60.7	78.9
13	Boiler horse power recovered...	81	114	148
14	Steam cost per ton paper dried..	4.98	3.46	3.02
15	Steam saved per ton paper dried	$0.99	$1.40	$1.81
16	Per cent steam saving by economizer over open room.....	20%	40%	60%
17	Combined saving, dollars per ton	$0.99	$1.93	$2.78
18	Combined saving closed machine over hood			$0.85
19	Combined per cent saving over open room		38.8	55.8
20	Combined per cent saving closed machine over hood.....			24.6

Waste in the Sulphite Industry*

By O. L. BERGER
G. D. Jenssen Company, New York City

THE old proverb "A penny saved is a penny earned" holds good today more than ever and especially so in our industry, where the profit of the mill generally depends upon our ability to save what we wasted a few years ago.

The actual physical waste of material during the process of turning wood into sulphite pulp is pointed out to us every day and I shall not speak much about that phase. I shall rather try to point out waste, which is caused by faulty processes and methods, or where savings could be made, if old methods were changed for those that are more recent and more improved.

There is absolutely no excuse for waste that we can detect with the five senses nature has given us. If such wastes are allowed to continue, something is radically wrong and thanks to co-operation and propaganda, we find that what is generally called "a bottled up mill" today is more a rule than an exception.

In the manufacture of sulphite we find the eternal triangle: quantity, quality and economy. We find that it is hard to maintain a high average of all these at the same time; as it is self-evident that by forcing one, the others are bound to suffer. If we desire quality, the production will be reduced and the cost will go up. If we, on the other hand desire a high production, we may lower the cost but are bound to sacrifice the quality. The governing factor is the selling price of the product, and in deciding upon the policy of a mill it is well to remember what is really wanted, and then aim to produce what is wanted as economically as possible. I believe that much money is wasted in our industry by loss of energy, caused by faulty conception of what is to be accomplished and how to accomplish it.

The five major items making up the cost of sulphite pulp are: wood, chemicals, steam, power and labor. Your cost accountant knows the cost of each of these items, and I would advise you to find out from him and check up from week to week.

With your permission I shall try to analyze each of these items rather than to discuss the operation of each department.

Wood

Those mill owners, who are fortunate enough to possess limits of their own, are responsible not alone for delivering the wood to the mill at a reasonable cost, but more so for proper woods operation, forest preservation and reforestation. They must maintain their supply of wood without cutting into the capital of the company and the resources of the country. When we shall realize the crying necessity of securing a permanent supply of raw material for the paper industry, which is so closely allied with the progress of our country, then, and first then, will we take the necessary steps toward stopping the waste in our forests; and this can only be accomplished by changing the methods which we use today, and run our woodlands on a scientific basis. We can get along without many necessities and luxuries of modern civilization, but it is indeed hard to picture ourselves cutting down the use of paper for writing, printing, wrap-

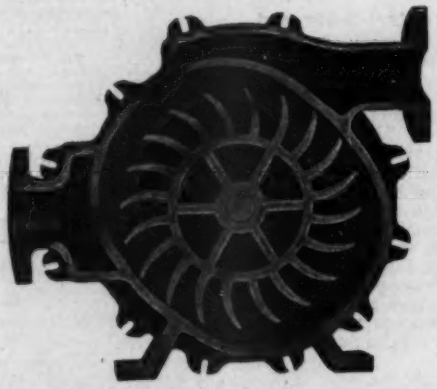
*Presented at the meeting of the N. W. Division of the American Pulp and Paper Mill Superintendents' Association, at Appleton, Wis., October 26, 1923.

THE HYTOR VACUUM PUMP FOR FLAT BOX SERVICE

Vacuum Produced Absolutely Without Pulsation

No Vibration

Saves Wires



Only One Moving Part

No Rods, Pistons, Crank Shafts, Loose Moving Parts, and No Gears

No Expert Attendance

Western Representative
T. H. SAVERY, JR.
1718 Republic Bldg.,
Chicago, Ill.

The Nash Engineering Co.
WILSON POINT ROAD
SOUTH NORWALK, CONN.

New England Representative
G. H. GLEASON
Nottingham Bldg.
Copley Square
Boston, Mass.

Would You Neglect a Leak in Your Steam Lines?

If a jet of steam were shooting from some pipe joint you would be making frantic efforts to stop the awful waste. Why, then, do you ignore the waste that is going on constantly **inside** your steam lines or steam heated machinery?

We mean condensation. It forms constantly—it cannot be stopped. Unless removed by proper drainage it retards steam circulation, and cools your paper machines, dryers, evaporators and mill heating system by moistening the heating surfaces and preventing efficient heat transmission.

A Morehead Back-to-Boiler System will stop that waste by constantly draining condensation **as it forms.** It will give you dry steam lines, coils and spaces and hotter machines. It will increase production and make every pound of fuel produce more.

Write and let us send you reports from other plants where big savings have been effected.

MOREHEAD MANUFACTURING COMPANY
Dept. O DETROIT, MICH.
(126)

Morehead

"BACK – TO – BOILER – SYSTEM"

POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

ping and all its other modern uses. You have all heard of the printers' strike in New York a few weeks ago. Can you imagine a city of the size of New York without the morning paper? The people were dumfounded and felt as if they were isolated from the rest of the world, not knowing anything about their favorite scandal, the baseball score or the European situation! It takes a situation like that to bring home to us the power of the press, and the necessity of a steady supply of paper, which again means pulpwood.

The introduction of the barking drum has probably done more than any other invention to help us in decreasing waste of wood; and in addition to this I shall only call your attentjon to the necessity of making a careful test of the chips, so as to make sure of a proper conversion of the wood into finished chips.

Chemicals

The chemicals used in the sulphite industry are sulphur and chlorine. I will also number under this heading lime and limestone.

All sulphite mills in this country use sulphur or brimstone in its metallic form, while we find many mills in Europe using pyrites. The low cost of sulphur in connection with the simplicity of its combustion, is a pretty good guarantee that we shall never go into the use of pyrites for sulphite acid. In localities like Alaska, with high freight rates and rich pyrites near the mill, it is no doubt possible to produce the sulphur unit cheaper from pyrites than from brimstone. But the cost of the roasting installation must be taken into consideration, and the absence of Selenium in the pyrites is also absolutely necessary.

In this country nearly 70% of the acid for sulphite is made from limestone. The difference in the cost of lime and limestone should in itself be a positive proof of the advantage of the limestone. Claims of the superiority of milk of lime acid on account of the advantage of a high percentage of Magnesium has yet to be proven, and furthermore, there are today many mills using a dolomite stone in their towers where calcinite is not obtainable. The mills using lime as the base for their acid, could save one dollar per ton of pulp by changing over to limestone. Just a matter of calculation.

The question of using bleach powder, liquid chlorine, or electrolytic cells is one which depends entirely on freight rates and power cost. Many mills are today operating electrolytic cells, who could better afford to buy the powder or liquid chlorine, while where power is cheap, production large and salt easy to obtain, the home made bleach naturally is of advantage. I think that most mills in this vicinity who still are using powder, could make money by buying the liquid chlorine simply by taking into consideration the losses of available chlorine and changing of the chemical composition of bleach powder during storage. A bleach plant may run perfectly satisfactory as such with minimum losses of chlorine and a low consumption, and a careful investigation may prove that money could be saved by a change in method as indicated above.

The direct saving in chlorine by the use of high consistency bleaching is another matter which should not escape your attention.

Steam

Our old friend "Hook 'er to the Biler" has finally passed to his reward. It doesn't seem so very long ago that we had the daily fight between the head fireman and the cook, and when the cook's main ambition was to pull down the steam to make the firemen work. Them days are gone forever. We know now how much steam it takes to cook a ton of sulphite, and the flowmeter tells the story better than the recording pressure gauge. By proper manipulation of the digester, there should be no extremely heavy pulls on the boilerplant and the ideal condition exists in Scandinavian mills where a steam storage battery, the so called Vapor accumulator, will take up any peak loads and furthermore stores excess steam during low peak periods. There are now a couple of these accumulators being installed on this side, and we can expect some interesting developments in this field. The utilization of the relief heat has been successfully solved by the Decker Process, which according to recent tests taken at Kenogami, P. Q., will bring the steam consumption per ton of pulp down below 4,000 lbs. The average mill uses today around 7,000 pounds, so the saving can be readily calculated when we know that the cost of steam is at least 50c per 1,000 pounds. We can't fool the flowmeter and the only way to get even with the steamplant is to boycott it and cut down the steam consumption.

The insulation of the digesters is bound to save radiation losses, and I have seen figures on these losses varying from $100.00 to $1,500.00 per year for a 10 ton digester. I understand that it costs $1.00 a square foot to cover the shell properly and again it is a matter for the cost man to figure out. One reason insulation is used so generally in Europe is, that they use a 3-inch lining while we on this side use a 7-inch lining which of course is a better insulator in itself.

Where we dry our sulphite, it is necessary to evaporate the water remaining in the pulp after it leaves the presses. This water amounts to 3,000 pounds per ton pulp, if the test is 40% air dry when the pulp enters the dryers. By the use of the Kamyr press, this water can be reduced to 1,650 pounds, and a consequent saving of over one-third of the steam necessary for drying the pulp is the result.

I mentioned before the use of high consistency in the bleach plant. If this is used it is possible to bleach cold, and even if a high temperature is used it is obvious that the less water the pulp contains the less steam it takes to heat it.

It has been proposed to condense the steam escaping from the vomit stack during the blowing of the digester. The water used in condensing this steam, which amounts to about 1,500 gallons per ton of pulp, can be used for washing the pulp in the pit and for logponds in the winter and may be of special benefit in certain localities.

The blowoff liquor also contains great amounts of heat, but the equipment necessary to recover this heat has not been developed so as to work in with the mill operation.

Power

Thanks to our efficient engineers, the use of individual motors replacing line shafts driven from reciprocating engines so generally known a decade ago, is now almost universal. The friction losses in the bearings and multitude of belts and gears in the old mills were immense, not to mention the loss in operation caused by the constant shutdown for repairs on belts and hot bearings.

The use of high efficiency pumps is still badly neglected by many and could be the cause of considerable saving if installed. Many mills are also using high pressure water throughout their wetroom when it is only necessary to use about 7 pounds on all showers, and no pressure at all on the mixing boxes. The only high pressure water needed in the wetroom is for the blowpit hose, which should have at least 40 pounds and for that reason should be supplied from a separate pump. In some cases unnecessary power is used because the mill is not designed right. The cheapest way is to lift once and then use the natural flow by gravity as much as possible. An extra story of the building, which would enable us to place the screens a little higher, would probably save an extra pumping of the whole production if a thickener or riffler is to be used.

In the woodroom we find more waste of power from inefficient conveyor installation, while in the acid plant, where milk of lime is used, the power could be cut in two if the limestone towers were employed.

I shall just mention a recent invention, U. S. Patent No. 1466413. This patent refers to the introduction of air in pipe lines for pulp to facilitate pumping of heavy stock. We know that it is nearly impossible to pump stock heavier than 4% with an ordinary centrifugal pump. If air is introduced it is possible to increase the consistency considerably, thereby decreasing the power consumption per ton. My idea of an efficient sulphite wetroom is one where the pulp is diluted and kept in suspension in the blowpit at 6% and pumped, by the use of this new pumping scheme, direct to the screen at an absolute uniform consistency; thereby not only saving the power, but eliminating the blowpit man, as the screenman could adjust the flow of pulp from the pit at will. This scheme is now going to be tried out in one of our leading sulphite mills and we will soon know how it is going to work out.

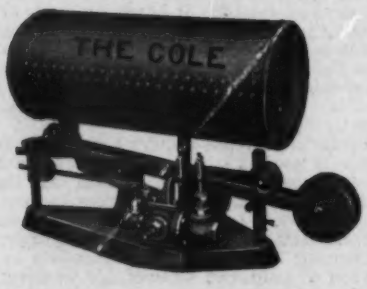
Under this heading I will also mention the Bullard gas washer and cooler, although it would rather come in under general efficiency. Outside of the fact that washing of the SO_2 from the burners removes SO_3 and free sulphur, an installation of this kind as a cooler will save power, as it is possible to cool the gas by direct contact with a fraction of the water necessary with our present gas coolers.

Labor

Although the cost of labor per ton of sulphite only amounts to one-third of the cost of the wood, it is safe to say that a good crew is the biggest asset any mill can have.

The average mill today employs about two men per ton daily production and this varies with local conditions. There are wonderful opportunities to reduce the payroll by installing labor saving machines and time saving devices, and as a man's wages will pay interest on a $20,000.00 investment, it behooves the superintendent to look into this and keep his mind open to improvements in mill equipment.

But outside of the actual saving in labor and reduction of the payroll, we have the co-operation of the men and their good will towards their superintendent and their company to take into consideration. We hear so much about Ford meth-



DON'T SPEND A NICKEL

on your power plant until you have investigated

The Cole System

of handling Steam Condensation

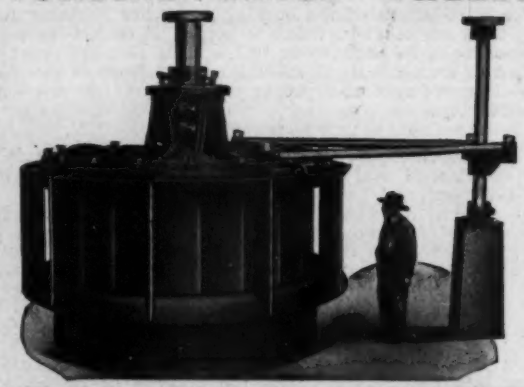
For Storage Heaters, Drying Coils, Pumps and Power Plant Specialties Write

THE GRANT E. COLE COMPANY

21 River St. TORONTO CANADA

LEFFEL

TURBINE WATER WHEELS



HIGH SPEEDS, HIGH POWERS, HIGH EFFICIENCIES

All of our turbines are designed and built to suit location and requirements, by engineers and experts who have had years of experience in this particular line of work. Turbines fully guaranteed.

Bulletins Forwarded Upon Request

The JAMES LEFFEL & Co., Springfield, Ohio

BRANCH OFFICES:

NEW YORK, N. Y.....39 Cortlandt St.
BOSTON, MASS.....80 Boylston St.
ATLANTA, GA.....Fourth National Bank Building
MINNEAPOLIS, MINN.....Plymouth Building
LANCASTER, PA.....Woolworth Building
PETERBOROUGH, ONT., CANADA...William Hamilton Co., Ltd.

$1000.00

CASH FORFEIT

$1000.00 Cash forfeit that the Stickle system for removing air and Condensation from the dryers and automatic regulation of steam for drying will dry more paper evenly with less steam consumed than any equipment manufactured for the same purpose under a competitive test.

STICKLE STEAM SPECIALTIES CO. **Indianapolis, Ind.**

WE-FU-GO AND SCAIFE

WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

ods, motion studies and mass production where each man is a piece of a big machine and does his work automatically regardless of individuality. In a sulphite mill this method cannot be carried out as it takes more than that to be a good acid maker, cook or even rollskinner.

And here is where the superintendent can accomplish the biggest saving, because of the fact that it is up to him to get the very best out of his crew or get them antagonistic and careless.

It has been my personal experience that it is good policy to advise with the men and get their opinion in matters pertaining to the operation of the mill. I feel that no superintendent knows everything and that the combined experience of his whole crew is better than his own. He is the general that leads the battle but the shooting is up to the individual soldier.

If the men feel that their opinion is respected and their suggestions followed, they are eager to suggest and help, while on the other hand they are easily hurt if snubbed by the boss.

The superintendent that feels his responsibility to such an extent that he asks no advice from his help, and is afraid to lose prestige by admitting his shortcomings, will always carry his burden alone and the crew will enjoy seeing him in trouble.

We can install everything possible in the way of charts, records and red tape to promote the efficiency, but when it comes right down to facts, the mill where everybody from the manager down are working in harmony, is the most successful and the mill where the best results are obtained.

In closing, I wish to say that the successful operator is the man that is up-to-date, that is willing and anxious to profit by other people's experience; and I know of no better place to get new ideas than at a meeting of this kind, where practical operators come with an open mind willing to give and take.

22,000-Volt Electric Steam Boiler

What is believed to be an absolutely unique installation was recently placed in operation in the Berlin, N. H., plant of the Brown Company, pulp, paper and chemical manufacturers. It is an electric boiler of 18,000 kilowatts (1,800 boiler horsepower), rated capacity operating at twenty-two thousand (22,000) volts, three phase, sixty cycles, 135 lbs. gauge pressure, and producing 50,000 pounds of steam per hour. It displaces sixty-nine (69) long tons of coal in twenty-three (23) hours, worth $550 under the boilers.

The boiler was installed for use only twenty-three hours on Sundays and other holidays, when the mill is shut down with the exception of sulphite digesters and other apparatus requiring steam every day.

The Brown Company wanted a large electric boiler to make use of all surplus power, and believed at first that a lower voltage would have to be employed. But after discussing this question with the builders it was agreed that the expense of step-down transformers could be avoided if a boiler could be made to operate successfully at 22,000 volts. The transformers would have cost twice as much as the boiler. It was recognized by both companies that no such boiler had ever been built or ever attempted, and that certain difficulties might be encountered which, unless overcome, might in the end make it necessary to employ a lower voltage as originally contemplated. None of the difficulties which there seemed reason to anticipate materialized, and the successful operation of this boiler is very gratifying to designers and users. Too much credit for this success cannot be given to Mr. George P. Abbott, electrical engineer of the Brown Company, whose confidence that a 22,000-volt boiler would prove practical never wavered.

The boiler consists of three vertical tanks, each 84 inches diameter and 82 inches high between heads. It occupies a floor space 25 ft. 6 in. long by 8 ft. 2 in. wide, and is 15 ft. 6 in. high from the floor to cable terminals. It requires total headroom of 24 feet from the floor to allow sufficient space for the removal of electrodes. A space ten feet long by five feet wide is also required to install the oil switches and barriers.

The difficulties which were anticipated were:

1. Insulation of the conductors where they enter the tanks. No trouble whatever was experienced.
2. Inability to operate at low load. In the first place, the Brown Company desired to operate this boiler principally on Sundays and other mill holidays and then at full load. However, in times of power shortage due to low water, it is desirable to use whatever power is available. It was found that the boiler operates quite as well at one-quarter load as at full load.
3. Rapid wear of electrodes. Actual results were most gratifying. Observations of the electrodes indicate that they will last five years, if used sixty days per year. But it is evident that the greatest wear occurs when the boiler is started and when shutting it down, due to arcing when contact with the water is made and broken. It is probable, therefore, that they would last a full year in continuous operation or with a comparatively small number of interruptions.

The cost of the installation was $25,000. Thus the boiler will have returned its entire capital cost in 46 days of 23-hour operation by the cost of the coal which it displaces.

While the number of places where large blocks of surplus power are available for this purpose is limited, there are a great many cases where smaller quantities of hydro-electric

One 18,000 K. W., 22,000 volt, electric steam boiler, installed at the Brown Co., Berlin, N. H., by the Electric Furnace Construction Co., Philadelphia, Pa. This boiler evaporates 55 tons of water per hour at 125 lbs. pressure

power are constantly going to waste through low load during the working day, and not used at all nights, Saturday afternoons, Sundays and other holidays. In other cases blocks of power are bought and paid for by the year whether used or not. Control systems have been worked out whereby electric boilers can be caused to automatically absorb surplus power at any time to produce steam or hot water and automatically to release the whole or any part of such power when the normal uses of a mill again require it. These automatic controls can be adapted to meet almost any kind of conditions. Hand operated electric boilers yield a very handsome return on their cost, and when equipped with automatic control, so that they will constantly "float" on a system, increase still more their earning power wherever there is a use for steam or hot water.

Union Bag to Build Mill in Louisiana

Negotiations are under way whereby the Union Bag and Paper Corporation, with main offices in New York City, will shortly commence operating a large paper bag factory in Bogalusa, La. The new plant is in process of construction and will be taken over and operated by the Union Bag and Paper Corporation, it is understood, although definite arrangements have not yet been concluded by the corporation and the builders of the bag factory.

The plant will be a part of the Bogalusa Paper Company and will be located on the north side of that company's paper mill in Bogalusa. Plans call for a three-story brick structure to be devoted entirely to the manufacture of paper bags. Paper for the bag factory will be supplied by the Bogalusa Paper Company, which is one of the largest paper mills in the South and which has shown marked progress in recent months.

An official of the Union Bag and Paper Corporation in New York stated that the corporation would not own the bag factory but that it had been practically agreed that it would operate it. The new plant will cost in the neighborhood of $500,000.

It is reported that the LaSalle Paper Co., of South Bend, Ind., has awarded a general contract to Kuehn & Jordon, 725 Welber St., South Bend, Ind., for the construction of its proposed new mill on the St. Joe River, comprising a main 1 and

Pulp and Paper Mill Machinery

Equipment of high quality manufacture which fills a need around Pulp and Paper Mills is being offered for sale by the Old Hickory Powder Plant at money saving prices.

Mammoth Jr. Jordan Engines. Maker Noble & Wood Co. Shell 5 ft. 6 in. long, with 10-in. inlet and 6-in. outlet. Capacity, 30 tons per 24 hours. Will run either direction at 350-375 R.P.M. Fitted with steel bar knives, block and oak fillers.

Welded Steel Digesters. Maker, Continental Iron Works. Capacity, 1300 cu. ft. Inside diameter, 8 ft. Length, overall, 27 ft. Working pressure, 110 lbs. per sq. in. Tested, 165 lbs. per sq. in. Each digester complete with cast iron supporting ring, hoppers, guides, and all accessories.

823 H. P. Stirling Boilers, type M-30, 200 lbs. pressure, with Westinghouse 8 retort stokers, Buffalo stoker engines, Vulcan soot cleaners, 100,000 cu. ft. capacity forced draft fans, Bailey flow meters, and all accessories.

Alberger-Curtis Boiler Feed Pumps, 8", 3 stage, 1050 g.p.m. capacity, direct connected to 181 H.P. Alberger-Curtis Steam Turbines, 150 lbs. working pressure.

Buffalo Forced Draft Fans, type T-D 9½, 100,000 cu. ft. capacity, direct connected to 225 H.P. Moore Steam Turbines.

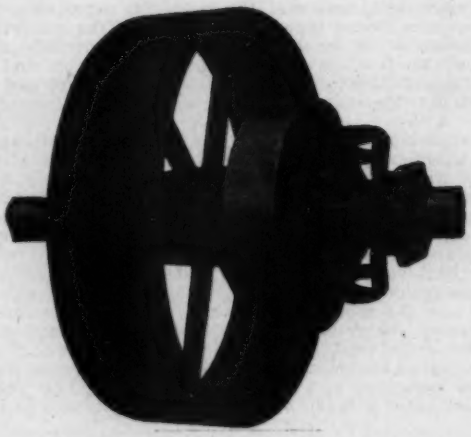
Feed Water Heaters	Compressors
Corliss Engines	Accumulators
Motors	Steel Tanks
Belt Conveyors	Transformers

Check the bulletin you want

No. 7 Tanks
No. 8 General Equipment
No. 14 Chemical Equipment
No. 15 Transmission

Write for prices, specifications, and further information

Old Hickory Powder Plant
Jacksonville, Tennessee



UNIVERSAL GIANT

A Thoroughly High Grade Friction Clutch

The Universal Giant is a thoroughly modern, high-grade Friction Clutch—compact in form, unusually strong, easily applied and readily adjusted. It is complete within itself and does not require specially constructed appliances to be fitted to it.

Being made with an extended sleeve of standard diameter, an ordinary pulley, gear, rope sheave or sprocket of regular dimensions can be used by simply keying it on sleeve of clutch. It is only necessary that bore be the same as diameter of sleeve.

May we send you our catalog?

It contains some interesting and useful data on POWER TRANSMISSION APPLIANCES and the problems which beset the user.

T. B. WOOD'S SONS CO.
CHAMBERSBURG, PA.

POWER TRANSMITTING MACHINERY

2 story structure, with a number of auxiliary buildings, estimated to cost close to $1,000,000, with machinery. Freyermuth & Maurer, Farmers' Trust Bldg., South Bend, are architects and engineers.

New Engineering Concern

A new engineering concern, under the name of the Richelieu Engineering Company, Ltd., successors to Beauchemin & Company, Sorel, Quebec, has been organized for the building of paper, pulp and special machinery to be used in connection with paper and its allied industries.

This concern has made connections with many of the leading engineering concerns of the United States, and is in a position to furnish complete specifications, plans and other data regarding the building of paper machinery; and will supply all kinds of bronze, lead and other fittings used in the industries. They also have sole manufacturing rights in Canada for Pope screens and brushing engines. A special feature is the arrangement which has been concluded to manufacture a line of manganese beater rolls, bed plates and jordan fillings which has hitherto been imported into Canada.

The company has appointed the John C. Corcoran Machinery Company, Ltd., as sales engineers with offices at 711 Drummond Building, Montreal, through whom all sales will be made.

Harold B. Wadsworth

Harold B. Wadsworth, formerly in the paper exporting and importing business at 51 East Forty-second street, New York, and a grand nephew of Hiram Cook, the last survivor of the War of 1812, who died in 1905 at the age of 105 years, died on November 3 in the Willard Parker Hospital, New York, at the age of 46 years.

Mr. Wadsworth was in Japan at the time of the recent earthquake and the illness which brought on his death was caused by the condition of the food and water in that country following the disaster. He went to Japan early in the summer to superintend the construction of several paper mills there. Up until six years ago he acted as consulting engineer on paper mills for many foreign countries.

Plans for extensive improvements are being made by the Waterway Paper Products Company, operating the only newsprint mill in Chicago, and it is announced that bids are now being received for a new unit necessary for the installation of an additional 166-inch Fourdrinier. The plant was established in July, 1920, with one machine. The plans for the enlargement of the plant include additions to the beater room, the power house and a building to house the new machine.

According to reports, the American Cellulose & Chemical Mfg. Co., Ltd., of Amcelle, Md., has tentative plans under consideration for the construction of a new building at its local plant, to cost in excess of $125,000. Guy Leonard is general manager.

The Tomahawk Pulp & Paper Co., of Tomahawk, Wis., are building a new wood room at their plant at King's dam. The company is also contemplating the addition of more dryers to the paper machine at Mill No. 1, to allow more speed and a better product.

The Elam Paper Co., of Marion, Ind., has plans under way for the construction of a new 2 story plant, totaling about 70,000 sq. ft. of floor space for its proposed new mill. This will replace the present works at Marion, which will be moved to Dayton, O.

The Board Division of the American Pulp and Paper Mill Superintendents' Association will meet with the Michigan Division at Kalamazoo, Mich., November 15th.

New England

Boston, November 1.

Heavy rains during October finally ended the drought of several months' duration, which had caused the closing of some paper mills and reduced operations at others. At Fitchburg, Mass., where the effects of water shortage had been most severely felt, the situation was alleviated and several of the Crocker-Burbank mills reopened. A disappointing and somewhat unexpected slump in board mill operations has occurred of late, however, and the present week the big Robert Gair mill at Haverhill, Mass., was down. Other smaller New England mills have been operating on part time.

It has been a month of low-price levels in raw materials, a condition that many mills have not allowed to pass without making the most of. Thus when coal touched $6, then $5.50, and finally $5.25, several of the largest New England consumers were eager buyers. It is the lowest price at which West Virginia steam fuel has sold during the past six years. Low prices on foreign pulps are also attracting considerable attention. Foreign kraft has been sold at 2.60 docks Boston, which is believed to be a record low, and bleached sulphite from Sweden has been bought by New England writing paper mills as low as 3.70 on the docks at Boston.

Portland Promises to Become Large Seaport

The strategic location of Portland, Me., as a pulp importing center has attracted a tremendous volume of business to the excellent facilities afforded by the State pier. Owing to the presence of the Grand Trunk Railroad in Portland, importers can ship pulp via the Grand Trunk to any paper mill in Michigan, Wisconsin, Illinois, etc., at rates no higher than those existing from any of the southern ports, such as Baltimore, Philadelphia or Norfolk. These differential rates are maintained by the Grand Trunk expressly for the purpose of drawing this traffic. Owing to the one to three days saving in steamer time which Portland enjoys over the southern ports, due to its being the nearest American port to Europe, many shippers much prefer to use it for their pulp business with western paper mills.

But the added advantage is that right back of Portland is the great New England paper mill district, with a potential consumption of pulp far exceeding that of any paper mills within similar distances of Philadelphia or Baltimore. Hence importers are able to cater to two big mill districts by using Portland as a base of stocks. The recently completed State pier at Portland has been literally flooded with Scandinavian woodpulp. Within the past month the directors of the pier turned down storage business enough to have kept the pier sheds loaded with pulp all winter. A huge storage building is contemplated to take care of this growing business and it appears likely that Portland will eventually become a great spot pulp market.

The first glimpse that New England paper men had of the workings of the Canadian Royal Commission hearing evidence regarding the proposed pulpwood embargo came at St. John, N. B., where the commission sat on October 18. Representatives of New England mills present at this hearing were Edgar Rickard of the Pejepscot Paper Co., Sheldon E. Vardwell of the St. Croix Paper Co., and W. B. Wentworth of the Penobscot Chemical Fibre Co. The New Englanders testified that the pulpwood movement had an important bearing on Canadian and American exchange, the money flowing to Canada for pulpwood materially aiding in maintaining existing rates. It was pointed out by several of the Maine mill men that thousands of employes of American mills reside in and are citizens of Canada and that they might have a precarious hold on their jobs, inasmuch as the American mills represented at the hearing would not be induced to move their properties to Canada. Another New England mill official was given close attention when he told of understandings between American buyers of and Canadian sellers of timberland, the former being assured that embargo would never become a reality, and that the timber was bought on that basis.

It develops that George Eaton, traffic manager of the Maine Central Railroad, desires rates on pulpwood that will be approximately 50 percent of sixth class. He would, by one sweep, abolish the favorable mileage commodity rates in existence for years. His proposal would cost a large pulp and writing paper mill upwards of $50,000 additional freight per year, and a prominent book paper mill would have to pay upwards of $60,000 additional yearly to the Maine Central. The proposition would almost hamstring a little wrapping mill that gets its wood by rail, wheras a big competitor of this same producer obtains his wood by water and would be unaffected. The paper mills, it is believed, have presented enough evidence to halt the Maine Central officials in their course. A less drastic advance is sought by the mills. Owing to 90 percent of this wood movement being entirely within Maine, the I. C. C. is without jurisdiction in the case.

The New England Regional Railroad Advistory Board is expected to be in operation by the middle of November. This body, which is headed by an appointee of the American Railway Association, consists of this A. R. A. permanent representative and various committees representing various industries. The paper industry will soon form its committee which will maintain close touch with car supply, movement, congestion, etc., at all points where paper mills are located in New England. Orders by the committee to rectify car shortages or other troubles are then to be promptly recognized by the offending railroad. It is a plan that is in practical operation in other parts of the country.

EASTWOOD Wire Mfg. Co.

Fourdrinier Wires
Cylinder and Washer Wires

Belleville, New Jersey
U. S. A.

WE ALSO MANUFACTURE

Valves, Unions, Cocks, Fittings, Digester Parts, Castings, etc., for Sulphite Mills from Our Perfection Bronze

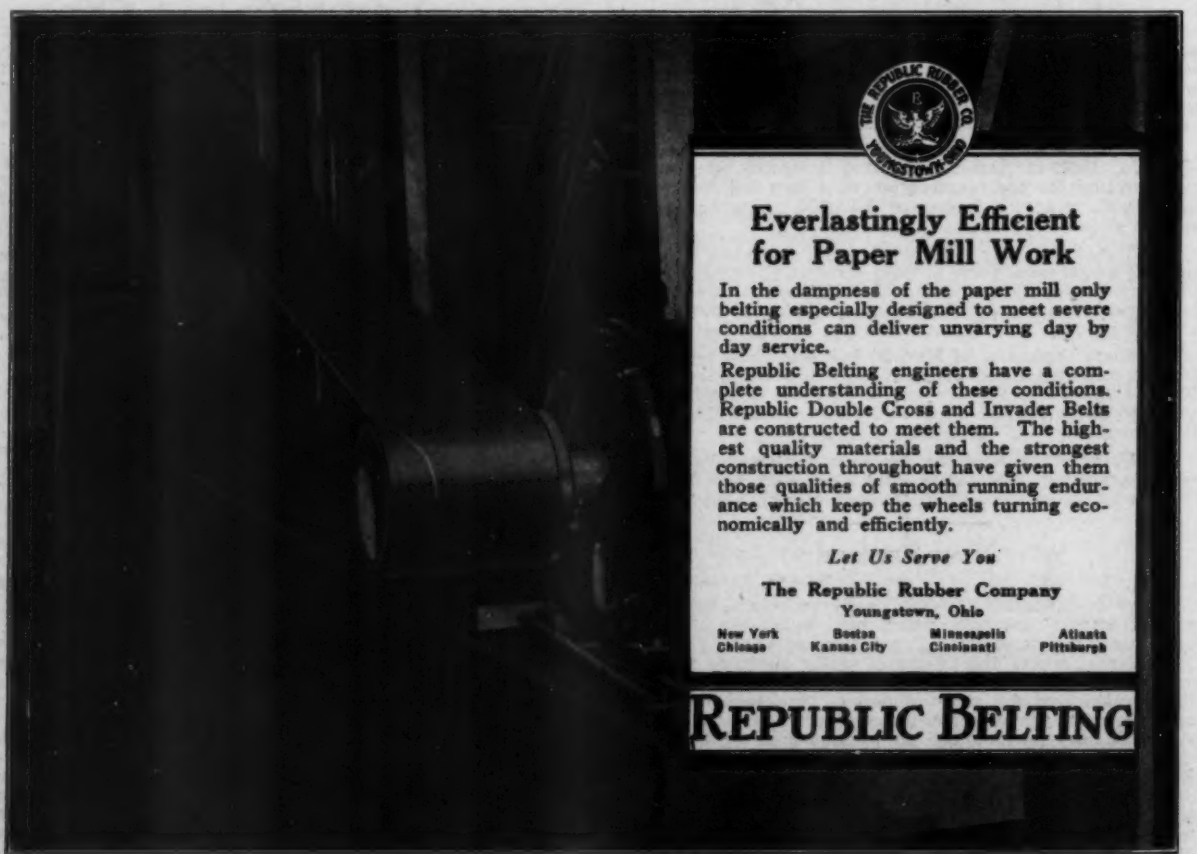
For Better Belt Service—

Send for This Free Booklet

It shows how to keep belts "on the job." How to reduce your maintenance expense. How to put belts up easily and quickly. Thoroughly illustrated. Send for it today—No charge. Write for booklet No. 5 to

CRESCENT BELT FASTENER CO.,
381 Fourth Ave., New York

CRESCENT BELT FASTENERS
"Make Good Belts Give Better Service"



THE REPUBLIC RUBBER CO. YOUNGSTOWN, OHIO

Everlastingly Efficient for Paper Mill Work

In the dampness of the paper mill only belting especially designed to meet severe conditions can deliver unvarying day by day service.

Republic Belting engineers have a complete understanding of these conditions. Republic Double Cross and Invader Belts are constructed to meet them. The highest quality materials and the strongest construction throughout have given them those qualities of smooth running endurance which keep the wheels turning economically and efficiently.

Let Us Serve You

The Republic Rubber Company
Youngstown, Ohio

New York Boston Minneapolis Atlanta
Chicago Kansas City Cincinnati Pittsburgh

REPUBLIC BELTING

Final adjustment of the firemen's dispute with the mills in Holyoke is announced by Agent Fred M. Knight, of the State Board of Conciliation and Arbitration. Mr. Knight as umpire in the wage dispute has handed down an award of 73 cents per hour, same as now, firemen having asked for 80 cents. Provision is made for double time on holidays and Sunday work is boosted to time and one-half. The award involves firemen in the employ of the American Writing Paper Co., Hampshire Paper Co., Carew Manufacturing Co., Taylor-Logan, Franklin Paprer Co., Valley and Parsons Paper Cos., and the Newton Paper Co. The adjustment is retroactive to October 1 and as both parties signified their willingness to abide by the decision of the umpire, no further trouble is anticipated.

The second week of October, Vice President F. A. Gilbert of the Great Northern Paper Co. announced that never in the history of the great Ripogenus Dam had water in the company's storage basin been so low. His reports from different storage basins showed a shortage of 5,000,000 cubic feet of water. Inasmuch as Rip dam produces normally 50,000 H. P. for the Great Northern, the importance of adequate water is considerable. One of the company's late log drives, that at Monticello amounting to 20,000 cords, was held up by the low water.

It is reported that the Hartford Tissue Mills, Inc., recently organized, will take over and operate the plant of the Burnside Tissue Paper Mills, Inc., East Hartford, Conn., bankrupt, recently acquired by Charles Boyland and associates for a consideration of about $125,000. The new owner will take possession immediately and plans for improvements; it is purposed to increase the capacity. Mr. Boyland heads the new company.

W. R. Brown, of Brown & Co., Berlin, N. H., America's largest kraft paper and sulphite pulp manufacturers, won fame for himself with his Anglo-Arab horse, which won the endurance race in the Genesee Valley in New York. The Anglo-Arab is a crossing of the thoroughbred and the Arab and is a product of France. Mr. Brown is considered to have done a great service to the country in importing these horses, he having now several of them.

P. H. Graham & Son Co., paper stock packers, have acquired a large brick building at 104 to 126 Ward street, Boston, which they occupied on the first of the month. The building is of five stories, containing about 86,000 square feet of floor space. Entirely modern equipment in the shape of baling presses and conveyors has been installed. The company lost its East Dedham street plant by fire a few months ago.

On October 12 practically the entire paper mill community of Holyoke was forced to suspend operations, owing to low water in the Connecticut river. The suspension was for only about two days, however, although mills were forced to curtail operations for several weeks before and after this time until the recent rains.

New England paper mills looking to establishing branches or pulp mills near sources of supplies are, among other places, considering the advantages offered by Woodstock in the Province of New Brunswick. A large amount of water power is available and excellent sites on the river are to be had still.

Annual statement of the Penobscot Chemical Fibre Co. is one of the most attractive paper mill reports issued to the Massachusetts Bureau of Corporations. It shows a profit and loss surplus of $3,458,823 after making liberal deductions for contingencies.

An involuntary petition in bankruptcy has been filed in the United States District Court at Portland, Me., against the Augusta Paper Co.

Northern New York

Watertown, N. Y., Nov. 1, 1923.

Closing of the No. 4 mill of the International Paper company at Glen Park recently, without any explanation forthcoming from August Tapfel, superintendent, has again given rise to the report, often circulated through this section, that the International is on the eve of withdrawing its paper making activities from the Black river valley. No. 4 mill, reopened in May, 1922, after it had lain idle for more than a year as a result of the I. P. strike, has never been a big producer, its output standing around 30 tons a day.

De Laval turbine driven centrifugal boiler feed pump delivering 700 gal. per minute against 698 ft. head at 2400 R. P. M.

Centrifugal Boiler Feed Pumps

DE LAVAL turbine-driven centrifugal boiler feed pumps have many advantages:

They are simple and compact. They give reliable and uninterrupted service and require little attention. There is an entire absence of vibration and shocks in the pipe line, thus making relief valves unnecessary and rendering the pump suitable for use with automatic boiler feed regulators or with flow meters. There is an entire freedom from liability to overloading. Troublesome parts, such as valves, packings, sliding surfaces, air chambers, etc., are eliminated. There is little expense for attendance and upkeep. All parts are readily accessible. Cylinder lubricants are not required and little oil of any kind is used. The steam consumption is lower than that of directly connected pumps. The exhaust is entirely free of oil and can be used in open feed water heaters or in drying rolls.

The above photograph shows a De Laval velocity stage turbine driven boiler feed pump designed to feed 14,000 H. P. of boilers under a maximum pressure of 300 lbs. per sq. in. The delivery pressure is controlled by an accurate pressure governor, in addition to which there is an overspeed emergency trip device operating an independent valve.

The turbine is of the latest De Laval design for high steam pressure and superheat. The valve chest is in the upper half of the casing, so that heat will not be conducted to the oil wells and bearings. Hand valves are provided for shutting off some of the nozzles, so that the highest efficiency can be maintained under changing conditions of steam pressure and load. The governor valves and operating levers are located above the center line of the turbine, where they are readily accessible for adjustment and inspection.

The pump is of the standard De Laval horizontally split casing design, all working parts being accessible upon lifting the casing cover, and removable after loosening the bearing caps. Four stages are used, as a moderate pressure per stage results in a longer life of impellers and wearing rings and in higher efficiency.

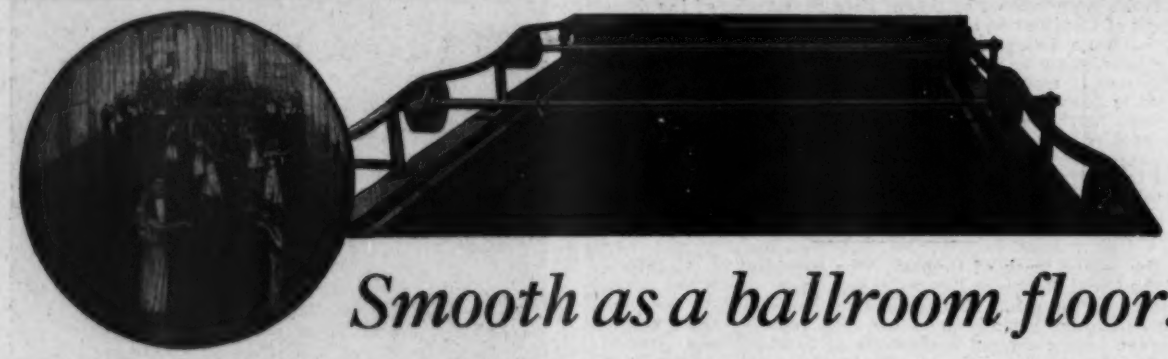
All De Laval pumps are guaranteed as to capacity and efficiency and are fully tested before leaving our works.

De Laval

Steam Turbine Co.

Trenton, New Jersey

Local Offices:—Atlanta, Birmingham, Boston, Charlotte, Chicago, Cleveland, Dallas, Denver, Duluth, Indianapolis, Kansas City, Los Angeles, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Toronto. 233



Smooth as a ballroom floor!

"SMOOTH as a ballroom floor" is a fitting description of Tyler Fourdrinier Wires. Every wire lays flat and smooth—there are no holes or pockets—no ridges or ripples—and the edges run straight and true with no tendency to become prematurely slack.

On a Tyler Fourdrinier Wire you can distribute the pulp in an even, uniform layer—a uniform amount of water can be removed at all points—and the possibility of deckle straps slipping is reduced to a minimum.

To assure the smooth, even, uniform surface of Tyler Fourdrinier Wires, they are woven on looms built especially by The W. S. Tyler Company and the weavers have had years of training in the art.

Tyler Fourdrinier Wires are supplied in all widths up to and including 250".

Samples upon request

The W. S. TYLER COMPANY, *Cleveland, Ohio*

The BLACK-CLAWSON Co.

HAMILTON, OHIO

Builders*—Paper and Pulp Mill Machinery—*for

INCREASED PRODUCTION **SERVICE ALWAYS**

The Ontario mill, one of the three owned by the International at Glen Park and Brownville, is now the only one of the trio running. Its capacity is also 30 tons. The C. R. Mill, named for the late Charles R. Remington, a pioneer paper maker of the Valley, was never started up after the strike.

The I. P. has under its control a choice water power site, available by combining the powers at the three plants. Some 15,000 horse power could be generated in a single development, engineers say. The I. P. has turned to the generation of hydro-electric power at many of its sites, and reports have been heard here that a similar step was likely for Glen Park.

Add Grinders to St. Regis Plant

Eight electric grinders have just been put into operation at the Deferiet mill of the St. Regis Paper company. Their capacity will be 75 tons of pulp every 24 hours, which, added to the 160 tons produced daily by the plant's 20 water grinders, will yield a 24-hour production of 235 tons, with normal water conditions. Pulp from the new grinders will flow by gravity to the news machine room of the mill.

The electric grinders were installed by the St. Regis some time ago, but so low has been the water in Black river that they could not be thrown into service. October 23, however, a 3.21-inch rain fell throughout the Black river valley, giving plenty of water. More electric grinders will be added from time to time, according to Corwin T. Jewell, assistant general manager of the St. Regis.

The production of newsprint, and in fact every kind of paper and other commodity manufactured in the Black river valley has been tremendously handicapped for three months past, owing to lack of rain and consequent low water. Many mills have been almost at a standstill, and in others the production has been cut to the bone. The St. Regis, for example, turning out at Deferiet alone more than 180 tons of news a day under normal conditions, has been getting out scarcely more than half of that amount. Its ground wood output fell from a natural low water mark of 70 tons a day to 30 tons, with the result that the company had to import much Canadian wood.

High Grade Paper from Hardwood

The Newton Falls Paper Company, located at Newton Falls, which is owned by the McGraw-Hill publishing interests of New York City, has taken an epochal forward step in paper making by the perfection of a process for the manufacture of the highest grades of book and catalog paper from hard wood, using sulphite. Credit for the discovery, which is the result of months of intensive study, must be given to W. D. Gregor, vice-president and general manager; Wesley Osborne, chief chemist; and Alex Kunzur, sulphite expert at the plant.

Book, bond, ledger, offset and cover paper are the varieties now being turned out by the company from hardwood. The woods most used to date have been beech, maple and birch, but the officials of the company believe other sorts of hardwood can be used equally well.

The Newton Falls company has an abundance of hardwood timber land, with a supply of standing timber large enough to enable the mill to run for 75 or 100 years, it is estimated.

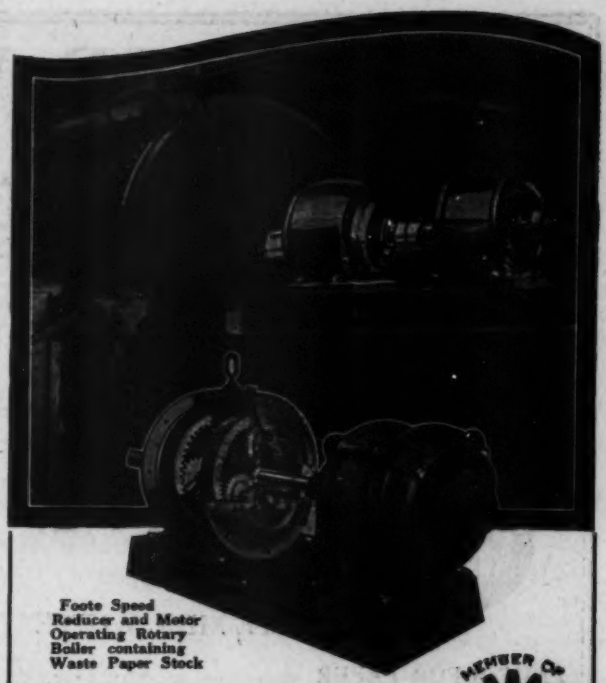
Install Giant Micrometer

A micrometer measuring 60 inches, and said to be the largest micrometer in the world, has just been completed by the Bagley & Sewall company, Watertown, manufacturers of paper mill machines. It will be used to measure rolls for paper machines made at the company's plant, and can be graduated down to one-thousandth of an inch.

The giant micrometer works on exactly the same principle as a smaller one, except that, because of its size, it must be rested on a center pin.

At Pittsburgh, Pa., there is in use a micrometer measuring 40 inches, and at Manchester, England, one measuring 48 inches. Engineering journals and records, however, fail to reveal any so large as the one made by the Bagley & Sewall company. The micrometer will not be manufactured commercially by the watertown firm.

Joseph A. Quinlan, traffic manager for the St. Regis Paper company, who is also chairman of the traffic committee of the Watertown Chamber of Commerce, was a leading figure in the fight, which has resulted in a reduction of class rates for freight in northern New York, averaging seven per cent. This cut puts freight traveling north of Syracuse and east of Oswego on a par, for rates, with that in the intermediate class on the main line.



Foote Speed Reducer and Motor Operating Rotary Boiler containing Waste Paper Stock

MEMBER OF AGMA

FOOTE SPEED REDUCERS

"The Proof of the Pudding"

"The proof of the pudding is in the eating," goes that old saying, and the proof of the advantages of Foote Speed Reducers is in their use.

You will never fully appreciate their value —why they save maintenance and upkeep cost, and provide better working conditions until you try a Foote Speed Reducer.

Foote Speed Reducers are the ideal method for reducing the speed of motors operating storage tanks, mixers, conveyors, and other paper mill equipment.

Try one Foote Speed Reducer on one piece of your equipment. Then you will realize why they will lower your power transmission costs. Consult Foote Engineers.

Send for literature

FOOTE BROS. GEAR & MACHINE CO.

Manufacturers of Rawhide and Bakelite Micarta. Pinions and Cut Gears of All Kinds. Send for Catalog.

250-260 N. Curtis St. Chicago, Ill.

J. R. SHAYS, Jr., 100 Greenwich St., New York City.

KING & KNIGHT, Underwood Bldg., San Francisco, Cal.

WYCKOFF WOOD PIPE

PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 46 inches.

The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

The Pipe of Service

DURABLE—ECONOMICAL—EASY TO INSTALL

Built of selected Canadian White Pine, Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 38,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

Write today for catalog and prices

A. Wyckoff & Son Company

1855 Elmira, N. Y., U. S. A. 1923

PAINT PROBLEMS
SOLVED

SACOLITE MILL WHITE

PYRAKOTE PAINT

PAINTS FOR PAPER AND PULP MILLS

Explain your troubles to

STEWART-ADAMS & CO.

430 NOBLE STREET
CHICAGO

PAPER AND PULP MILL PAINT SPECIALISTS

Ad-A-Kote Insecticide and Deodorant

See Paper and Pulp Mill Catalogue

"MICHIGAN" Combination Steel and Wood Pipe

LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

THE MICHIGAN PIPE COMPANY

Dept. 17 BAY CITY, MICHIGAN

New York City, N. Y.....17 East 42nd St.
Oklahoma City, Okla.....105 West 16th St.
Chicago, Ill.....Leiter Bldg., 15 East Van Buren St.
Boston, Mass.....Room 737, Oliver Bldg.
Cleveland, Ohio.....919 Ulmer Bldg.
Chattanooga, Tenn.....702 James Bldg.
Philadelphia, Pa.....318 Widener Bldg.
Pittsburgh, Pa.....323 Fulton Bldg.

"Steel for Strength—Wood for Durability"

MATERIAL HANDLING SECTION

Material Handling and Conveying Equipment in the Pulp and Paper Mills

By JOHN A. KAGERHUBER
Mechanical and Consulting Engineer

PROBLEMS involving the saving of labor come to the foreground more and more every day. Material handling equipment steps in and closes the labor gap caused by restricted immigration. By taking the place of human labor, not available, material handling equipment offsets the downward immigration curve and speeds up the production in industry, especially in pulp and paper mills, where a large volume of material is being handled. One secret of industrial economy is to balance labor cost against overhead and maintenance of machinery, and to select the cheapest method. Add men, and you have additional labor costs; add conveying machinery equipment and you will increase the effectiveness of the labor you now have.

Storing and Handling Fuel

Pulp and paper mills in most cases have considerable trouble in securing enough coal for a continuous operation during the winter months, when storage space is not ample enough and strikes are threatening. There are some points to look into in fuel storage. Coal should be stored as close as possible to the place of consumption—the boiler house. Coal should not be piled over twelve feet high and should be divided by passageways. In larger plants, coal may be stored in bunkers over the boilers and a pile in the yard. When coal is stored in bunkers over the boilers, as is often the case, it can be fed to the stokers by gravity at a low cost. Sometimes it is advisable to install a larry under the bunker, taking fuel from the bunker and distributing it to the stoker. In either case, automatic weighing and recording devices can be attached and thereby an absolute check obtained on every pound used. Coal handling systems are expensive to install, and we seldom see them in plants generating less than 500 B. H. P. When the coal comes to the mill it should be dumped into a hopper under the track, with a crusher in a pit underneath this hopper, so that coal can be crushed if it is too large for the stokers. From the crusher a bucket conveyor should take the coal to the bunker, where belt conveyors can be used to carry the coal horizontally to any distance, but a larry is preferable. Where coal has to be conveyed only a short distance, screw conveyors may work out satisfactory. In this sort of conveyor the coal is dumped into the receiving end from an elevator and pushed on by the screw to various discharge holes in the bottom of the trough. This trough can be hinged at the receiving end, which makes the outer end free to swing. This way coal can be distributed to any part of the bunker.

Wood Yard

With the great quantities of wood used in paper mills, a large area is required to store pulp wood for immediate need and for seasoning. For this reason stacking and recovering equipment is required. Many different schemes are being employed for this work. In some plants traveling cranes with wood grapples are used successfully; in others traveling stackers work out more satisfactory. Advantage may be taken of the slope of the land to distribute the wood from the top of an incline, by sliding it from the cars at the top down inclined conveyors or chutes into long piles, and recovering it by continuing its course down hill to the wood room cars or conveyor at the bottom. In some mills, pulp wood is being floated to the wood room. At any rate, the handling of wood in paper mills is still in its infancy, and the writer believes that the next five years will bring marked improvements for the handling of this particular material.

Handling Shredded Pulp

Mechanical conveyors are frequently used to handle pulp in laps or after it has been shredded. Some mills use pneumatic conveyors for this purpose. A pneumatic conveyor solves many conveying problems. The principle of the pneumatic conveyor is very simple. A partial vacuum is maintained within an enclosed tank by a motor driven exhauster. The conveyor ducts lead to this tank, the ducts being provided with self-feeding nozzles. The high velocity of air blast within the duct conveys the material, which is released upon dissipation of the blast within the tank. The material passes through a rotary, air-lock, discharge gate directly to the storage bins, or may again be blown to remote discharge points by utilizing the air blast from the discharge side of the exhauster. A suitable dust collector has to be provided to protect the exhauster, and with hot materials, automatic cooling or quenching occurs in transit. The pneumatic conveyor is particularly adapted to chemicals, coal, cement, wood chips or any bulk material in which the pieces are small and not sticky or fragile. For wood pulp the pneumatic conveyor is used by unloading the pulp from the box cars in the form of laps and fed to a shredder and from there blown into a storage bin.

Electric Industrial Trucks

There are any number of places around a paper mill, where lazy materials can be pushed into action with industrial trucks and tractors. These powerful, speedy machines put tons in transit where hand trucks carry pounds. They travel along swiftly; they take any grade with ease; they keep production flowing steadily; they cut material handling costs to the lowest mark. The economical operation of a truck or tractor depends on the storage battery, therefore great care should be taken in selecting batteries. Mills that use trucks and tractors are saving enormous sums. Wasteful handling and rehandling, picking up and putting down, piling and repiling, loading and reloading are being reduced to a minimum with a carefully worked out lift truck system. By keeping materials in process and in storage on platforms or warehouses, they have speeded the movement of raw and finished product.

Fighting Fires with Portable Conveyors

The writer recalls a plant where fire in a large coal pile was fought with portable conveyors. Approximately 20,000 tons of stored coal caught on fire. Stationary equipment, such as elevated railway and wooden A-frame supports were quickly put out of commission. Reclaiming conveyors underneath and around the piles was speedily rendered useless. Then it was remembered that there were, somewhere around

BOWSER ESTABLISHED 1885

For Your Own Trucks

Your trucks will operate for less money and at higher efficiency if you operate them on gasoline that's served through a Bowser pump in your own garage.

You save on engine repairs—the centrifugal separator in a Bowser pump takes out *all* water and dirt, greatly decreasing carbon and minimizing carburetor troubles. You save on the driver's time running the truck over to the filling station and back. You insure maximum mileage per dollar of gasoline—you get all you pay for—that's important.

We can prove to you that, with a Bowser gasoline pump and a Bowser outfit for lubricating oils, you can save money on truck and car operation. We can show you others in your vicinity, or in your line of business, who are thus saving money. Ask us—we will give you the facts, on an engineering basis, and leave the decision in your hands. Please address Department 8.

S. F. BOWSER & CO., INC.

LUBRICATION ENGINEERS AND MANUFACTURERS

FORT WAYNE INDIANA

LUBRICATORS—FILTERS—COMPLETE CUTTING OIL SYSTEMS

"STANDARD UNITS INDIVIDUALLY ENGINEERED"

the plant, two Barber-Greene portable conveyors, which were immediately pressed into service to move the huge pile of coal. As many as 15 men were at one time shoveling coal to the 60-foot portable conveyor and a great amount of money was saved in this manner. Portable conveyors are very helpful also for rehandling loose material from the yards into trucks for use.

Steam Jet Ash Conveyors

The outstanding merit of the steam jet type of ash conveyor brought it into prominence too quickly for its own good. Engineers, realizing its utility, became blind to the need for careful design. They assumed that a few feet of cast iron pipe, a nozzle, and a steam supply, made an ash conveyor. Installations of some well known ash conveyors, however, are proving every day that it takes more than a superior principle and cast iron pipe to make a real steam conveyor. Outstanding, in the writer's opinion, is the Detrick-Hagen Ash Conveyor. Typical of the improvements that have enabled Detrick engineers to perfect the steam jet conveyor is the multiplex nozzle arrangement. However, the use of an ash conveyor when properly designed for each individual plant is a great money saving machinery for any plant of any size.

Fig. 1—Crane and electric hoist for coal storage

Save Money with Your Switching

Car pullers are built to pull your cars, spotting them on your switch siding just where you want them and when you want them. There is no necessity for using the whole bull gang for moving a car. One man and a car puller does the trick. That is the way to cut switching costs.

Belt Conveyors

Probably no other equipment of the material handling type has ever experienced such an increasing popularity that is now accorded the belt conveyor. New applications have been developed which greatly widened the scope of this class of labor saving equipment. In the handling of various materials, the belt conveyors of the present day are being generally used in greater widths and lengths than has previously been the practice.

If you handle materials, you can save time, labor and money. Whether you handle just a little or a great deal; whether you handle packed goods or loose materials; whether you stack, convey, load, unload, elevate or perform any other handling method, there is a handling machine on the market somewhere, which will help to make additional profits. Investigate. Find out whether your competitors are not enjoying an advantage over you in quicker and cheaper handling methods. Every company that handles goods, packed or bulk, by old fashioned hand methods, really pays for a handling machine over and over again in time, labor and money that could be saved.

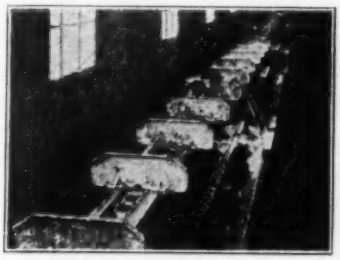


Fig. 3—Scraper conveyor

Automatization as the Solution to Labor Shortage

By RUSSELL B. WILLIAMS
Link-Belt Company, Chicago

IN A RECENT issue of a Chicago newspaper there appeared what seemed to me the outstanding cartoon of the year. Divided into two parts, the upper portion of this cartoon illustrated a manufacturer standing in the door of his bust factory, arms outstretched, beseeching the government to let down the bars to immigration and provide him with more labor. The second portion showed a vast army of unemployed men (the result of unrestricted immigration) over which walked a red propagandist sowing the seeds of discontent and revolution.

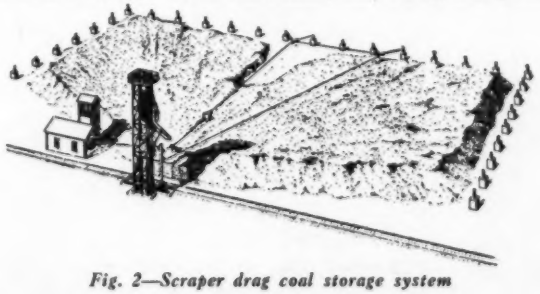


Fig. 2—Scraper drag coal storage system

And so it is. Sufficient labor in times of prosperity and progress react upon their former employers in times of depression. And while there are admittedly two sides to the question, there is at present a surplus of 275,000 jobs—and all the evidence in the world that the existing labor shortage

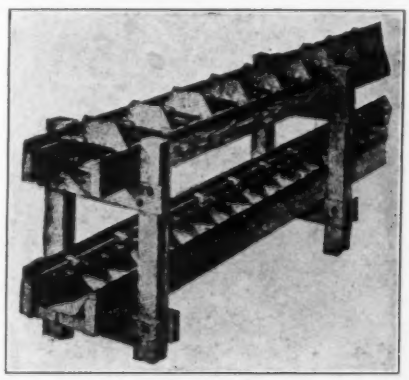
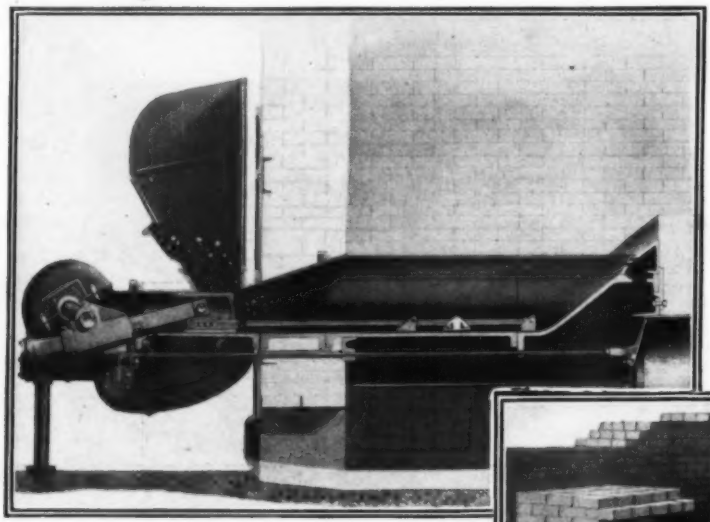
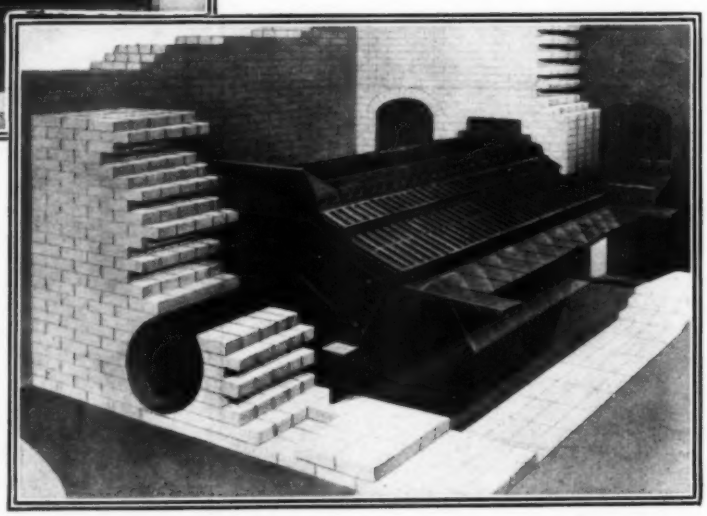


Fig. 4—Flights

Design and Construction of Detroit Single Retort Underfeed Stokers



Assure Complete Control of Combustion



Complete Control of the Fire: The Detroit Single Retort Stoker can be operated from the same engine or motor which operates the fan, and distinct regulation is provided, whereby the feed of the fuel to the furnace may be increased or decreased as desired, without changing the speed of the fan or the air pressure. This is accomplished by changing the position of the sliding block on the connecting rod, in or out, while the stoker is running, thereby feeding more or less coal to suit the requirements.

The ram and pusher rod are connected to the crank through the connecting rod or driving bar, which has a simple lost motion device so arranged that the entire travel of the feeding mechanism may be adjusted to suit the conditions of the fire, and the fuel to be burned.

Regulation: Fuel is delivered below the fire uniformly throughout the entire length of the retort. The arrangement for admitting air under control through specially designed tuyeres at both sides of retort, together with the means provided for regulating the amount of coal to be burned in accordance with the steam required, assures uniform steam pressure while producing high overloads on quick demand.

Design Sets New Standards: Detroit Underfeed Stokers are "*built* heavy for hard service and durability." Their design and construction sets new and higher standards in stoker manufacture. Progress is marked by an ever growing stream of repeat orders.

You will never know what a REAL stoker should and can do until you install a Detroit Underfeed. Ask for Bulletin 242

DETROIT STOKER COMPANY

Underfeed Forced Draft and Overfeed Natural Draft Stokers

242 GENERAL MOTORS BUILDING DETROIT, MICH

DETROIT UNDERFEED TYPE U SINGLE RETORT STOKERS

ASSURE CHEAPER STEAM PRODUCTION

will continue for some time to come, if not actually grow. However, that same labor shortage may be a blessing in disguise, by way of acting as a stem to the flood of communistic propaganda that is growing day by day throughout the country. An army of unemployed men can do more damage in one week, politically, socially and materially, than an acute labor shortage will throughout the course of a year. And if that statement is doubted, just look to our Mother Nation, England, where there are 1,250,000 men without even the prospect of gainful employment; where the Government must maintain enormous appropriations to care for the annual "doles"; where labor forms a real political party (as powerful in England as the Democratic Party is in the United States), and where that labor element holds a recognized and important place in Parliament. Nor is the red complexion altogether lacking in that English Labor Party.

But all of this is aside the point. The real problem is: how can *we* overcome *our* labor shortage *without* letting down the bars to undesirable aliens and unassimilable foreigners who come to our shores with but one or two ideas, that of fattening their pocketbooks or promoting the cause of Bolshevism. There *is* a way to accomplish this desired end, and, as

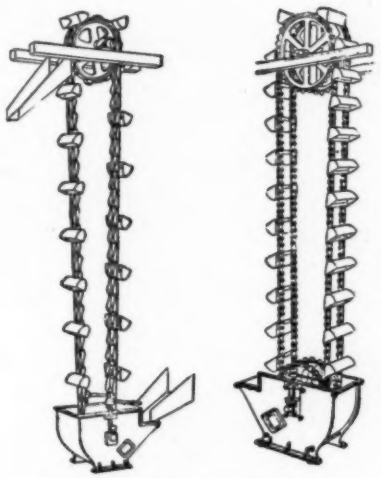


Fig. 5—Bucket elevators

is the case with so many perplexing problems, the solution is simple. It is merely—machines instead of men.

Nor is there, because of present labor union and governmental policies, any other way whereby this end may be attained. The automatization of industry, or the development

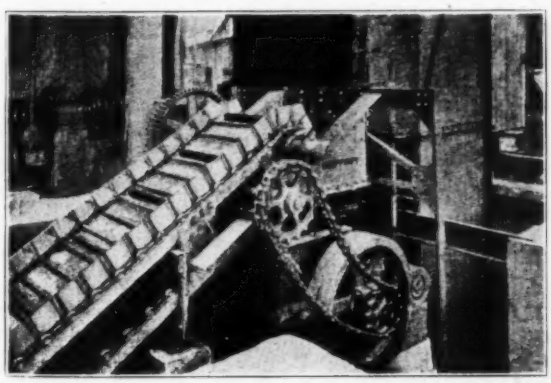


Fig. 6—Apron and pan conveyor

and improvement of such automatization as has been made, is the one solution. Returning to a prosperous period always necessitates an increase in our productive capacity and the expansion of our distribution systems. And if men are not to be had, the only way in which these things can be accomplished is through the introduction of more and more machines.

Economists agitating a "perfection" in our monetary system, theoretical salvation in the form of new laws or consuming the midnight oil in a vain endeavor to better industrial relations, seldom if ever assist in the solving of this problem. There lies before us one way as the solution for high wages, reduced hours and efficiency, increased production or the lack in the supply of common labor, and that solution is machines.

It is an American characteristic to boast of our superingenuity. We heard much of what this abilty was going

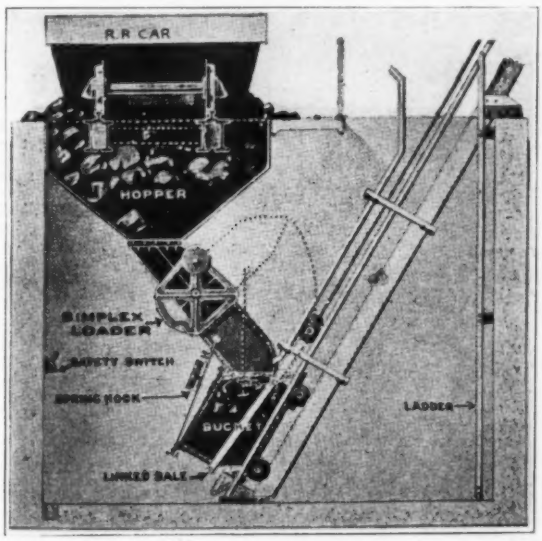


Fig. 7—Skip hoist elevator

to do for us and the world in general back in the warring days of '17 and '18. Yet the fact remains that we have scarcely begun complete industrial adaption or application of labor saving and labor aiding machines. I find no hesitancy in saying that eighty per cent of all the manufacturers in the country could save the time of from one to twenty-five men, through the installation and use of better designed and more efficient machinery. And while such machinery effects a downward trend in prices (or an upward curve in profits) it does not decrease wages. It is seldom, if ever, that such application of machinery fails to effect some economies or reduce some costs. Evidence of this is on every hand, for although our mills and factories have not installed one-tenth of the mechanical substitutes needed, few are there who have not had some experience with bettered mechanical methods.

I have in mind a coal mine operator in central Illinois who, beginning immediately after the installation of a crawler

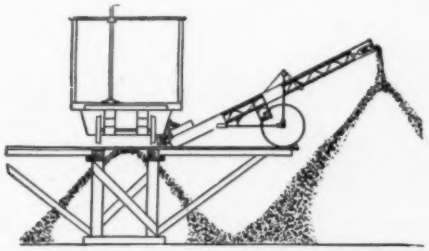
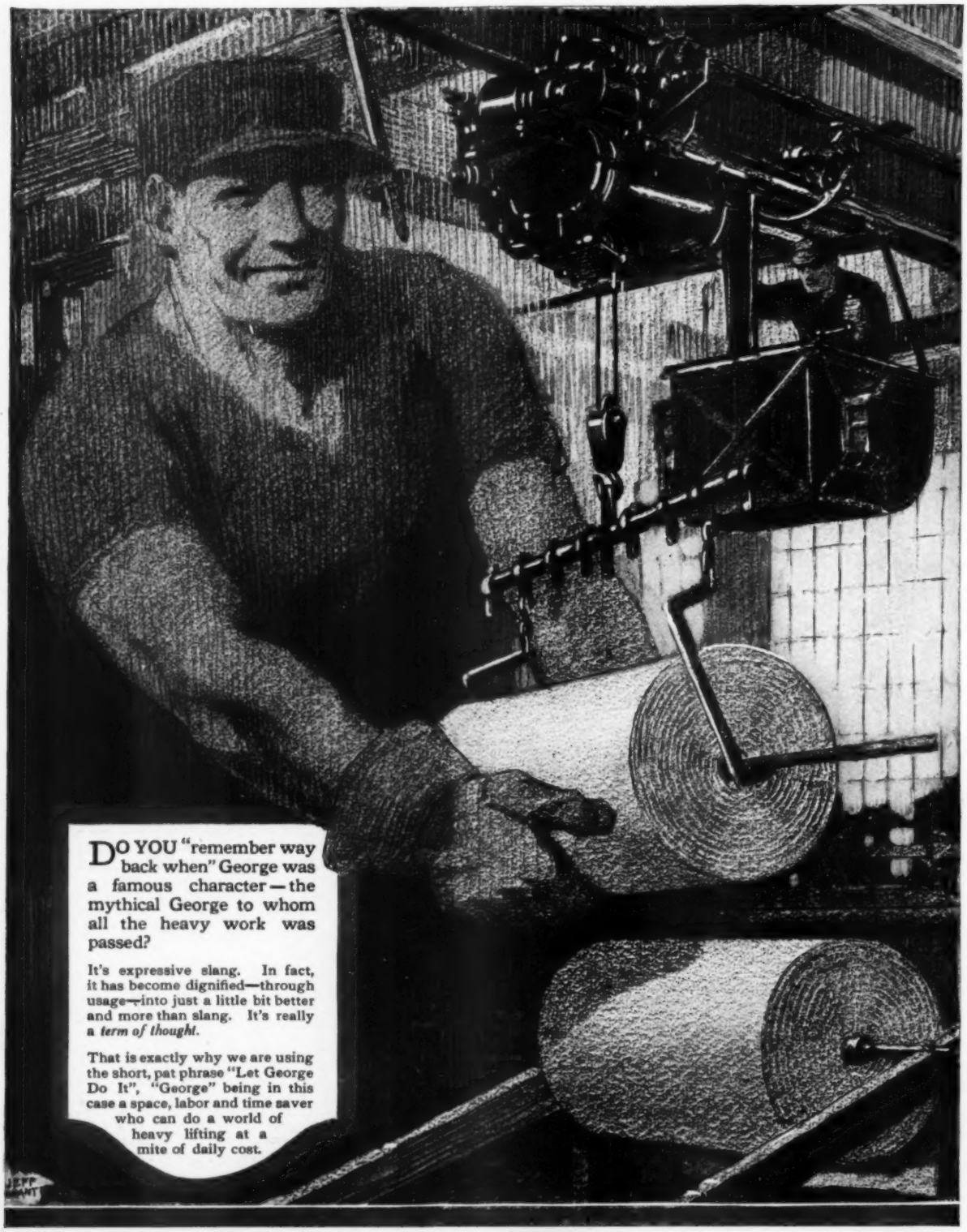


Fig. 8—Coal trestle and hopper car

type gasoline crane, affected a saving of fifty men a day for a period of ninety days. At six dollars per day per man the total amount saved meant a great deal to him. And another instance is of a manufacturer of automatic telephones, who, through the installation of several motors and an equal number of direct, silent-chain drives, affected an economy in labor costs alone of over eighteen hundred dollars a year—or something like a return of one hundred and twenty-five per cent on his investment.

Electric Hoist Does Work of Two Men

Says Mr. Buhler, superintendent of the Philadelphia Pa-


DO YOU "remember way back when" George was a famous character—the mythical George to whom all the heavy work was passed?
It's expressive slang. In fact, it has become dignified—through usage—into just a little bit better and more than slang. It's really a *term of thought.*
That is exactly why we are using the short, pat phrase "Let George Do It", "George" being in this case a space, labor and time saver who can do a world of heavy lifting at a mite of daily cost.

LINK-BELT

Let GEORGE *Do It*

GEORGE is the Link-Belt Electric Hoist, the busiest time-and-labor saver that ever cut down Old Man Overhead.

We call him George—and so will you—just as soon as you realize, through plant use, the hundreds of moving and lifting jobs you've been spending too much money for.

You need a whole booklet in order to understand the many neglected savings you can accomplish with George's help.

This is *Catalog Number 480.*

Send for it today.

Glance its pages. Note the many users in many lines—experienced buyers who buy for *profit.*

Then have a Link-Belt Engineer come to your plant, look it over and tell you and show you where George can and should be used—how a Link-Belt Electric Hoist should be installed.

This is simply an announcement, spread here in the hope that your natural saving curiosity will prompt you in wanting many more facts—but we repeat:

You, too, will call him George once you learn his many big and good points—learn them through daily proof of this outstanding fact:

A Link-Belt Electric Hoist will move things from one part of your plant to another *at the lowest possible cost* in the *quickest possible time*, by the simple expedient of turning *dead* ceiling space into *live* moving room.

Catalog 480—a request on your letterhead—and we'll plan it all out for you.

You can get George—The Link-Belt Electric Hoist—as low as $300 f. o. b. Philadelphia or Chicago.

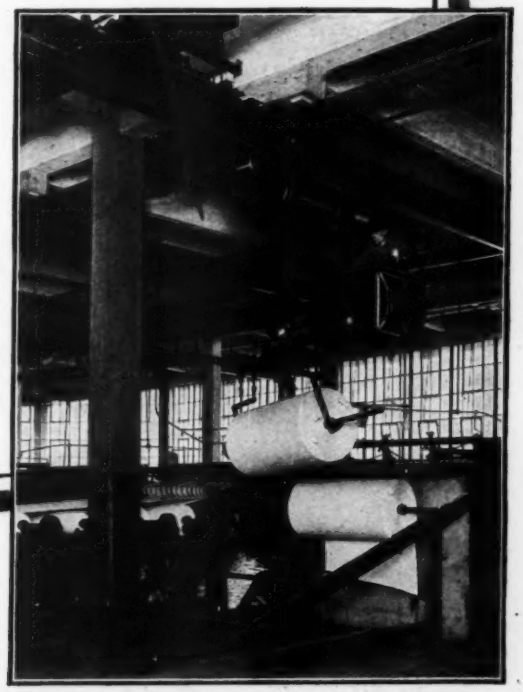
LINK-BELT COMPANY

PHILADELPHIA, 2045 Hunting Park Ave.
CHICAGO, 300 W. Pershing Road
INDIANAPOLIS, Belmont Ave. at Big Four R. R.

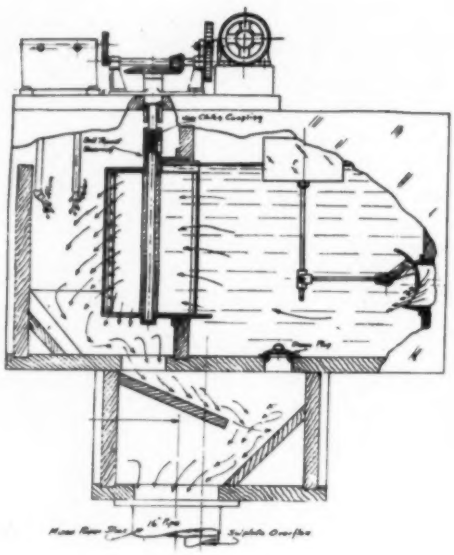
New York	Woolworth Bldg.
Boston 9	49 Federal St.
Pittsburgh	335 Fifth Ave.
St. Louis	Central National Bank Bldg.
Buffalo	745 Ellicott Square
Wilkes-Barre	2nd National Bank Bldg.
Huntington, W. Va.	Robson-Prichard Bldg.
Cleveland	329 Rockefeller Bldg.
Detroit	4210 Woodward Ave.
Kansas City, Mo.	306 Elmhurst Bldg.
Seattle	820 First Ave. S.
Portland, Ore.	101 First St.
San Francisco	168 Second St.
Los Angeles	163 N. Los Angeles St.
Denver	Lindroth, Shubart & Co., Boston Bldg.
Atlanta	24 Marietta St.
Louisville, Ky.	Frederick Wehle, Stark Bldg.
New Orleans	C. O. Hinz, 504 Carondelet Bldg.
New Orleans	Whitney Supply Co., Ltd., 415 S. Peters St.
Birmingham, Ala.	S. L. Morrow, 720 Brown-Marx Bldg.
Link Belt, Ltd.	Toronto & Montreal

H. W. CALDWELL & SON CO., CHICAGO.
NEW YORK, Woolworth Bldg.
DALLAS, TEXAS, 709 Main St.

1358



ELECTRIC HOISTS



METER YOUR SLUSH STOCK

and know what yield you get per cord and how much stock actually goes to the Paper Machines.

USE **Trimbey and Tibbitts Proportioning and Metering System**

KNOW that you have exactly uniform proportions of Stock, Color, etc., with mechanical control and ready means for regulating total output and the percentages of any or all ingredients.

SAVE **POWER—LABOR—FLOOR SPACE**
FIRST COSTS—MAINTENANCE COSTS

Salient Features of this SYSTEM:—

Trimbey Consistency Regulators
All **Meters** mechanically geared together
Recording Counters for Stock Meters
Revolving Meters for each Ingredient
Variable Speed Motor Drive
Float Valves for Stock, Color, etc.

SYSTEMS in operation or under construction:—

ONE—Finch Pruyn Co., Inc.
FOUR—International Paper Co.
ONE—Backus Brooks Co.
ONE—Kymmene Aktiebolag (Finland)
FIVE—Minnesota & Ontario Paper Co.
ONE—Bathurst Co., Ltd.
TWO—Ontario Paper Co., Ltd.
TWO—St. Croix Paper Co.

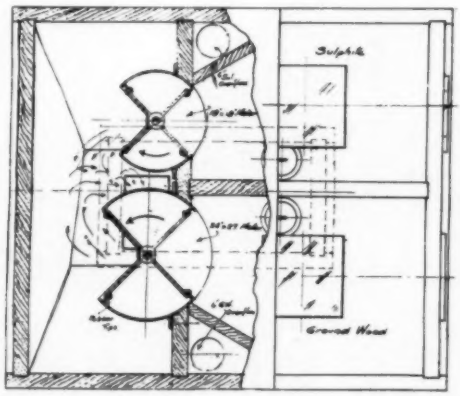
Trimbey Machine Works

Glens Falls, N. Y.

We also manufacture:
Allen and Trimbey Continuous Mixing System
Float Valves for Stock Chests
Trimbey Consistency Regulators
(More than 250 Consistency Regulators in use in the U. S., Canada and in Foreign Countries.)

Also "Made in Canada"

ASK US



per Manufacturing Company, Philadelphia, Pennsylvania: "Our plant employs two electric hoists; one in the disposal of ashes and the other for carrying rubbish from the mill to the incinerator.

"The one transporting ashes has been in constant opera-

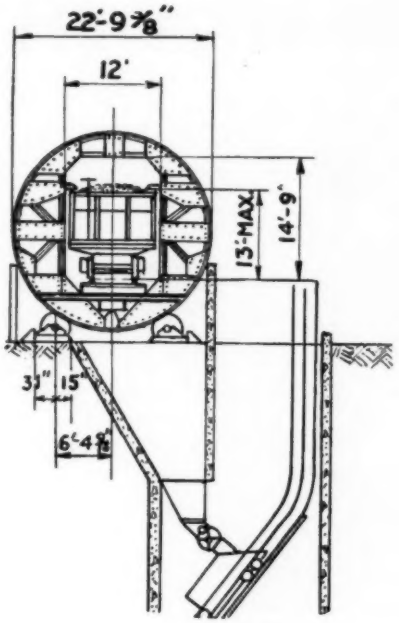


Fig. 9—Coal car dumper

tion for over a period of eight or nine years, while the other has been installed but eight or ten months. Both are giving very satisfactory service, they requiring but little attention and practically no adjustment.

"In considering the saving or economies affected by the rubbish hoist, it can be safely said that did we not have the electric hoist and were compelled to dispose of the rubbish by hand, that it would be necessary to add two men to our

Fig. 10—Portable belt conveyor

payroll. This extra help at prevailing prices would run into a $12 daily labor cost. Saving $12 a day totals $3,600 annually (300 days to the year). This is the gross saving affected through our single electric hoist handling rubbish.

"To arrive at the *net* annual saving, it is necessary to deduct all expenses from the gross saving. These can be calculated as follows:

Interest on investment at 6 per cent—	
$1,200 @ 6%.....	$ 72.00
Depreciation on ten year basis.....	120.00
Repairs (estimated)	160.00
Maintenance, oil and attendance.....	50.00
Total annual expenses.....	$402.00

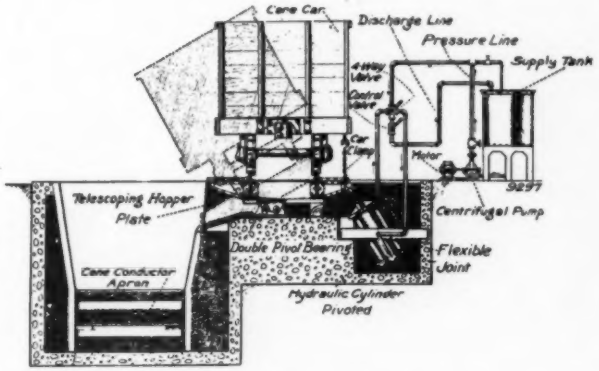


Fig. 11—Car tipping mechanism

"Thus we have an expense of $402.00 in the operation of a machine which gives us a gross saving of $3,600.00. The difference equals the net saving, or $3,198.00."

Perhaps the most completely equipped plant with which the writer is familiar is that of Dill and Collins, not far along the banks of the Schuylkill River from the mill spoken of above. Here, also, complete records have been kept which makes possible an accurate analysis of the results obtained through the equipment maintained.

From among the great variety of machines in operation perhaps the Peck Carrier, which was installed for the handling of coal and ashes, is most readily analyzed in the

Fig. 12—Pivot bucket conveyor

matter of economies affected. The cost of this equipment, including both the overhead coal bin and the coal and ashes handling machinery (overlapping, continuous bucket elevator) was approximately $40,000.00. According to Mr. Taylor, of

Union Renewable Tooth Sprockets

Are the Greatest GOOD WILL Boosters That Have Happened in Years

Why Buy a New Sprocket and Spend Half a Day Making the Change Just Because a Few Teeth Wore Out?

You Don't Buy a New Automobile Wheel Every Time You Renew a Tire. Then Why Buy an Entirely New Sprocket Wheel?

Buy New Teeth Only—The Body Lasts Forever

And the average cost of the time spent in removing an old sprocket and installing a new one will, in many cases, more than pay for new teeth, which can be quickly inserted without removing the chain.

It's Fully as Good as It Looks

THE BODY is of cast steel or semi-steel, depending on service conditions. The face and sides of the rim are turned, and the holes accurately spaced.

THE TEETH shown in the cut are of manganese steel, very strong and extremely wear resisting. Other wheels have drop forged steel teeth, deeply case hardened to insure long service. Made in pitches 3 inches and larger.

THE BOLTS expand the circular ends of the teeth causing the latter to become practically an integral part of the body. Cotter pins prevent the nuts from turning. The teeth stay put.

SPLIT SPROCKETS are furnished when ordered, but in view of the permanent nature of the body and its installation, we recommend that it be made solid, thus making the job 100% trouble proof.

WHEN ASKING FOR PRICES state number of teeth, pitch of chain, size of shaft, and whether cast steel or semi-steel body is preferred. A brief description of your service conditions will better enable us to co-operate with you.

THE UNION CHAIN & MFG. CO.

SANDUSKY, OHIO, U. S. A.

the Dill and Collins Company, this equipment, beginning immediately with its installation, reduced the number of men handling coal from eight to five, which saving equalled $3,580.-

Fig. 13—Pulpwood storage system with towers and cable

00 annually. The number of firemen, per shift, has been reducted from five to three, resulting in a saving of $7,254.00 per year. One ash-wheeler, per shift, was eliminated, which

Fig. 14—Pulpwood storage with towers and trestle

saving was equivalent to $3,524.00 a year. The total savings due to the installation of this machinery totaled $14,358.00 annually.

Fig. 15—Locomotive crane

It is also interesting to note that since the Peck Carrier started operation, the boiler room generated approximately 20 per cent additional power with a ten or fifteen per cent increase in the consumption of coal.

The figures given above consider only the savings affected in labor costs. This equals the gross saving. In the calculation of the net savings, it is necessary to deduct all costs incident to the operation and maintenance of the machinery. This cost, Mr. Taylor tells us, is approximately $5,600 a year, that figures being divided into four divisions: viz: Power cost, $400.00; Maintenance at 2 per cent, $800.00; Depreciation at 5 per cent, $2,000.00 and Interest at 6 per cent, $2,400.00. Therefore, deducting from the gross $14,358.00 the cost of $5,600.00 we have the net annual saving of $9,758.00. In round numbers, ninety five hundred dollars a year, or an investment return of over 23 per cent. The figure of five per cent for depreciation will undoubtedly

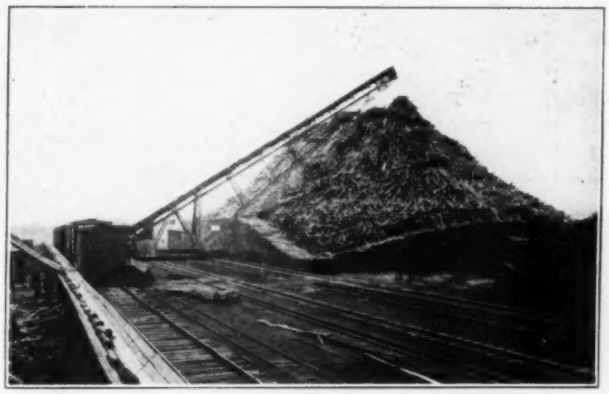


Fig. 16—Pulpwood stacker

cause some comment, owing to the fact that machinery is usually depreciated on a ten year basis. In this case, 5 per cent should be ample, for, with a little care, the coal bin will undoubtedly remain in use for twenty years, while the

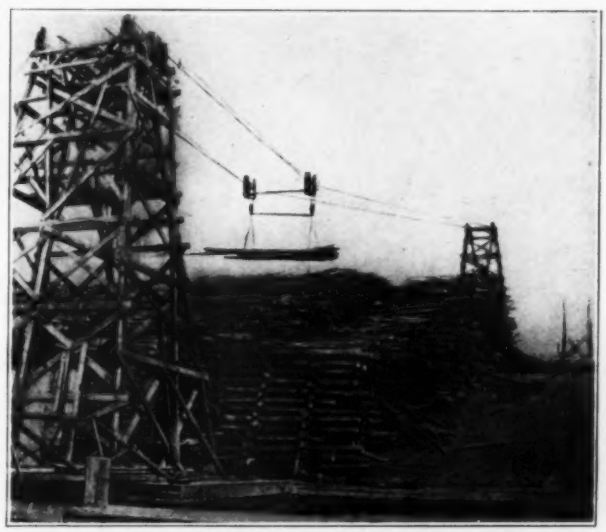


Fig. 17—Duplex traveling log piling cableway

machinery, with proper replacements when necessary, will remain efficient indefinitely.

Log Stacker Saves Ten Men a Day

Mr. Taylor says, with regard to the installation of the log stacker:

"The results from the installation of this piece of apparatus has been a saving of ten men a day for ninety days in the year. This means, in dollars and cents, $3,080.00 a year."

The cost of the machine installed was approximately $6,-000.00. It is operated by a 20 H. P. motor, and as the machine averages seven hours a day, the yearly hours will total 2,100. At the rated horsepower this operation means 42,000 horsepower hours per year. Assuming the cost to be one cent per H. P. hour, we have a power cost of $420.00

Turning Labor Losses Into Dividends

Your Board of Directors are continually looking to you for a saving in operating costs in your Power Plant. One of the biggest items charged against operating expense is labor. By cutting down labor costs you automatically reduce the operating expense. This means increased earnings—dividends.

Webster Equipment is designed to cut labor charges to a minimum. Perfection in design and rugged construction make this possible. Our Engineers have given years of study to the proper handling of coal and ashes in power plants. They stand ready to assist you in the correct selection of equipment to meet your particular requirements.

Let them help you.

THE WEBSTER MFG. COMPANY

4500-4560 Cortland Street, CHICAGO

Branch Offices

BOSTON.....902 Oliver Bldg.
BUFFALO.....572 Ellicott Square
CINCINNATI.....1914 Union Central Bldg.
CLEVELAND.....500 Swetland Bldg.
NEW YORK.....90 West Street
PHILADELPHIA..719 Commercial Trust Bldg.

Factories

CHICAGO, ILLINOIS TIFFIN, OHIO

Agencies and Representatives

Atlanta, Ga.....Fulton Supply Co., 70 Nelson St.
Baltimore, Md. H. W. Faunt LeRoy, 523 Calvert Bldg.
Birmingham, Ala...G. R. Mueller, Brown-Marx Bldg.
Denver, Colo.....C. L. Dean, 1718 California Ave.
Detroit, Mich., Palmer-Bee Co., 2778-2794 E. Grand Blvd.
Knoxville, Tenn...Webster & Co., Holston Bank Bldg.
Louisville, Ky...E. D. Morton & Co., 516 W. Main St.
Memphis, Tenn..E. C. Atkins & Co., Maine & Butler Sts.
Milwaukee, Wis....W. Clasmann Co., 620 Wells Bldg.
New Orleans, La., Globe Supply & Machinery Company, 625-627 S. Peters Street.
Pittsburgh, Pa...Dempcy-Degener Co., 708 Penn Ave.
Salt Lake City, Utah, L. W. Mendenhall, 517 McIntyre Building.
Salt Lake City, Utah.....Gallgher Machinery Co.
Seattle, Wash., The Brinkley Company, 651 Alaska St.
Vancouver, B. C...B. C. Equipment Company, Ltd., 613 Bank of Nova Scotia Bldg.

Canadian Factory-Sales Office: WEBSTER-INGLIS, LIMITED, 14 Strachan Ave., Toronto, Ont.

the year. Knowing this, we can calculate the other charges as follows:

Power cost	$ 420.00
Maintenance cost, 2%	120.00
Depreciation at 10%	600.00

Fig. 18—Jack ladder

Interest at 6%	360.00
Supplies	80.00
Total	$1580.00

Fig. 19—Single chain drag conveyor

Subtracting the annual costs of $1,580.00 from the gross saving of $3,080.00 leaves a net saving of $1,500.00 a year, which is a 25 per cent return on the investment.

Another interesting installation at this plant which, although there are no figures available to show its actual labor saving, has proven a great help in the shipping department, is the truck haul. The level of the shipping room floor is below the level of the car loading platform. In trucking the heavy cases of paper to the cars under this arrangement, it was necessary for the men to redouble their efforts as

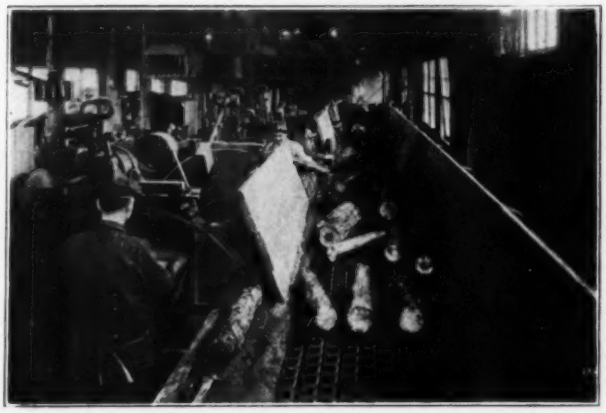


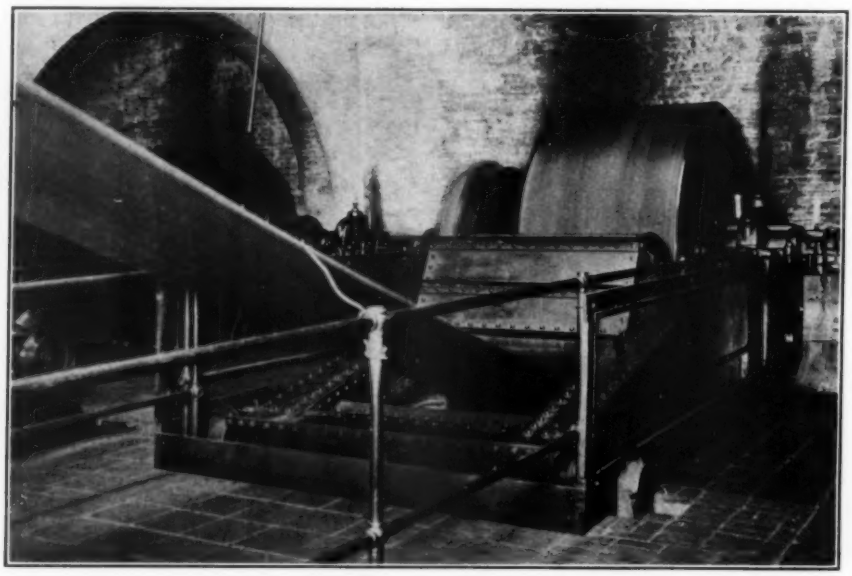
Fig. 20—Detachable chain log conveyor

they "negotiated" the incline. To make it possible for the truckmen to load their cars more easily and rapidly, a chain truck haul was installed. This haul is on 40 foot centres and is inclined at an angle of about five degrees. It consists of a single strand of malleable iron chain with "pushers" at intervals of three feet. These pushers engaged the axles of the trucks and pull the load up while the truckmen hold the handles. The chain speed is about 60 feet a minute. It operates in a steel channel on the upward run, sliding back on flat iron tracks supported by wooden stringers underneath the floor. The power required for its operation is 3 H. P.,

Fig. 21—Button and cable conveyor

and it is capable of handling 2 trucks of 850 pounds each at one time.

Without doubt there are many many more such instances of labor economy. These are just a few that have come to our notice, and they are set here as examples to show the



Point Number One—"Arc of Contact"

SEVERAL factors must be taken into consideration in planning a belt drive to insure its successful operation. The most important of these is the **arc of contact** between the belt and pulleys.

An arc of contact sufficient to transmit the load may be obtained by two methods:

Natural—by the use of long pulley centers and slack belts, involving a large amount of floor space;

Artificial—by the use of tension idlers or idlers of the flexible, resilient type when acting as belt wrapping devices, such as

THE LENIX DRIVE

A lack of floor space may prevent the use of the natural means. Where the necessary floor space is available it is expensive to use it for the purpose of giving long pulley centers to a belt drive. The disadvantages of the tension idler offset the benefit obtained through the slightly increased arc of contact it creates.

For eighteen years we have been building the "belt wrapping" LENIX DRIVE and are the pioneer manufacturers in this country of this type of drive.

At the plant of a brick manufacturer in New Jersey, a 1400 H. P. Corliss engine could not deliver more than 900 H. P. because, through lack of sufficient arc of contact, the belt would not hold on the lineshaft pulley when the load was raised above 900 H. P.

A Lenix drive was installed and, as illustrated, is wrapping the 50", three-ply belt around practically three-fourths of the circumference of the lineshaft pulley, and the engine is now delivering its full capacity.

Booklet "Saving Slippage and Space" tells how it is done.

How belt tension is reduced, rather than increased, by the Lenix will be told next month under "Point Number Two."

Five Points

1—**The Lenix increases the arc of contact between belt and pulley.**

2—The Lenix maintains, constantly and accurately, the proper tension in the slack side of the belt.

3—The Lenix saves floor space, building space and belting because of freedom in pulley locations.

4—The Lenix saves in bearing friction, lubrication and renewal of bearings because of reduced bearing pressure.

5—The Lenix permits the use of less expensive, high speed and high efficiency motors or generators because of the higher pulley ratios.

F. L. SMIDTH & CO.
ENGINEERS
50 Church Street **New York, N. Y.**

THE LENIX DRIVE

justifiability of substituting machines for men wherever possible. But all of us know something of value of labor-aiding machinery and equipment. We know that when wheelbarrows replaced the loads on men's backs, humanity was benefited immeasurably. And we know that with the electric trucks and tractors which are rapidy supplanting the "Irish buggies," as they are affectionately known to the heavy muscled chaps who run them, the human race will still more be benefited. We know that should we wipe from the face of the earth all of the power driven machines we would find

Fig. 22—Roller and belt conveyors handling pulp laps

it impossible to exist, for we could not crowd onto this globe enough men to produce even the barest essentials.

But, as said before, we are at least 80 per cent behind our own ability. We have the machines and devices available. Let us put them to work. Automatization will alleviate the labor shortage, tend to level wages, increase production, and in many cases, better our quality and reduce prices.

Fig. 23—Belt conveyor carrying chips

In the words of H. K. Condit, in a recent issue of the "American Machinist," here is the situation:

"The industries of the United States are certain to be faced with a shortage in the supply of common labor.*** It is obvious that if this country is to continue to expand industrially, means must be found for doing by machinery the work done in the past by hand labor. The men to operate the machines are at hand, the capital to purchase them will be found when it is needed. It remains for the*** manufacturer to install the machinery to do the work of industry. A great duty and a great opportunity lie before them."

Handling Materials in Pulp and Paper Mills*

Part Two of the Progress Report of the Committee on Waste

IN THIS age of high labor costs the large industries are rapidly adopting all available methods of conserving labor and reducing costs. The handling of raw materials, stock

Fig. 24—Electric lift

and the finished product represents cost items that can often be reduced by the installation of adequate equipment. Many developments and improvements have been made in recent years in handling machinery and the modern tendency is to eliminate, as far as possible, the wasteful manual movement of materials.

The Waste Committee considered it advisable to gather all available data and illustrate the special application of handling and conveying equipment applicable to the pulp and paper industry.

Classes of Material Handling Problems

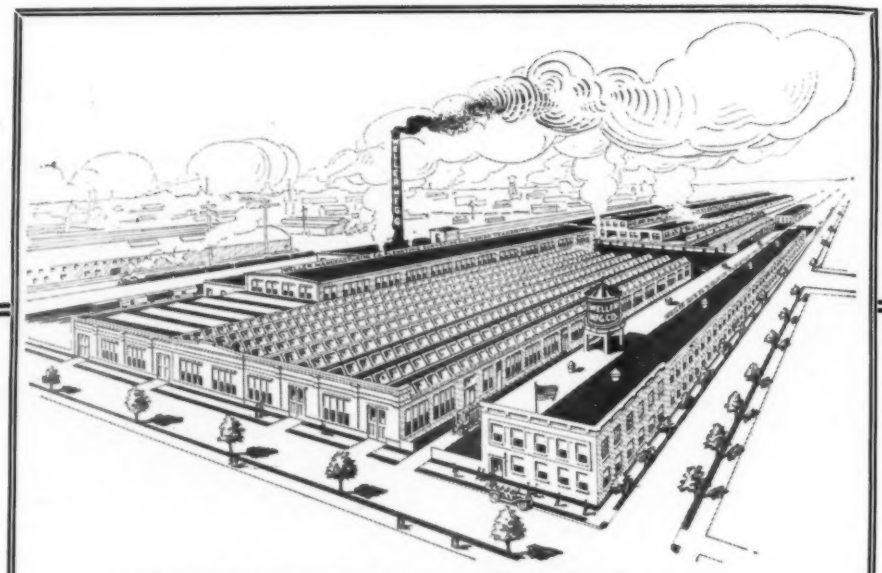
Every handling problem is a special study in itself although in general mechanical equipment should be considered whenever the following conditions are evident:

1. Continuous stream of materials to be moved over 50 feet.
2. Continuous lifting of loads.
3. Elevation of quantities of materials.
4. Lowering of quantities of materials.
5. Whenever materials require ½ hour or more of manual labor to be moved intermittently.

Fig. 25—Apron conveyor

6. Continuous movement of materials for a distance of over 6 feet.
7. Continuous assembly work.

*Presented at the meeting of the Technical Association of Paper and Pulp Industry, at Appleton, Wis., October 26, 1923.



THE PLANT OF THE WELLER MANUFACTURING COMPANY, CHICAGO, ILL.

CONVEYING AND POWER TRANSMITTING MACHINERY

WELLER MADE CHICAGO

DESIGNED TO MEET THE REQUIREMENTS OF

The Pulp and Paper Mill

GIVE US A TRIAL

A Few of Our Products

Apron Conveyors.	Malleable Chain.
Belt Conveyors.	Steel Chain.
Bucket Conveyors.	Sprockets.
Chain Conveyors.	Pulleys.
Drag Conveyors.	Hangers.
Pan Conveyors.	Gears.
Spiral Conveyors.	Collar Oiling Bearings.
Bucket Elevators.	Friction Clutches.
Elevator Buckets.	Speed Reducers.
Screens.	Car Pullers.
Storage Bins.	Power Shovels.

Coal and Ash Handling Equipment

Heavy Sheet Metal Work

WELLER STEEL CHAIN

FOR
Elevating and Conveying

We make chain to meet your requirement

Send us your specifications

WELLER MANUFACTURING COMPANY

1820-1856 North Kostner Avenue Chicago, Ill.

Sales Offices

NEW YORK BALTIMORE BOSTON PITTSBURGH CLEVELAND DETROIT SAN FRANCISCO

Classification of Handling Equipment

Although much of the equipment used in handling materials has been developed for some particular purpose it is often adaptable to conditions in other industries. In general, the

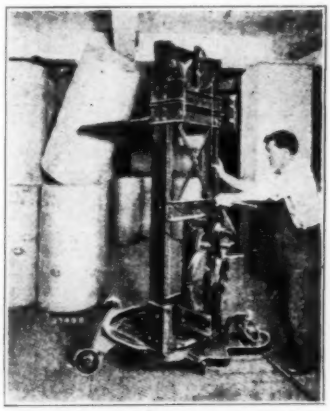


Fig. 26—Hand operated lift

classification of the different kinds of material handling machinery is as follows:

I. Hoisting Machinery.

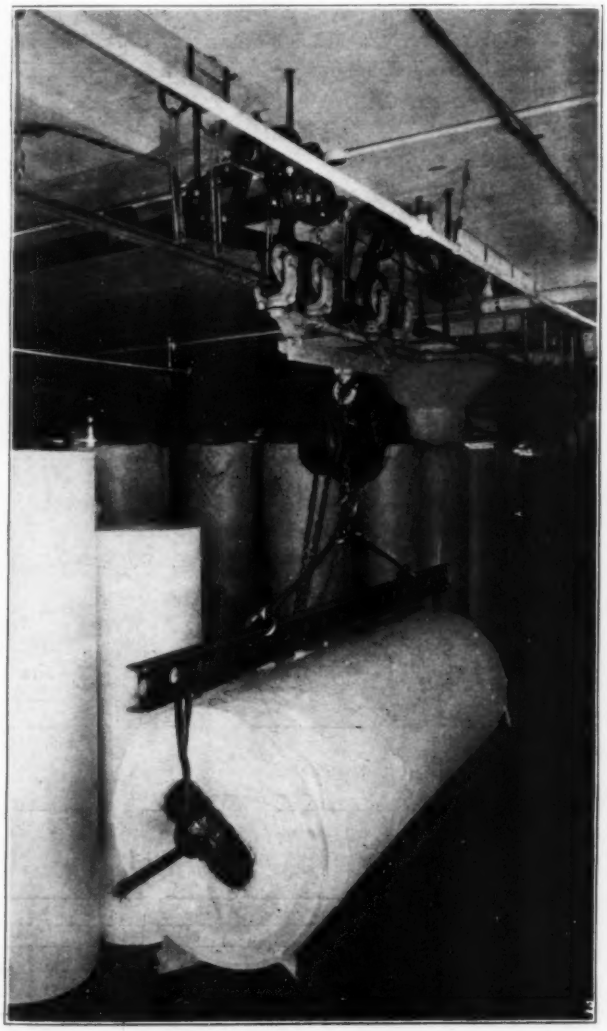


Fig. 27—Monorail with chain hoist

1. Cranes.
   (a) Overhead traveling.
   (b) Gantry.

Fig. 28—Electric truck handling newsprint rolls

   (c) Jib.
   (d) Steam, electric and gasoline.
2. Hoist.
   (a) Hand chain.
   (b) Pneumatic and electric.
   (c) Monorail and telphers.
3. Derricks.
   (a) Stationary.
   (b) Portable.
   (c) Light duty.
4. Excavating Machinery.
   (a) Power shovels and dredges.
   (b) Dragline excavators.
5. Cableways.
   (a) Cableways.
   (b) Cable tramways.

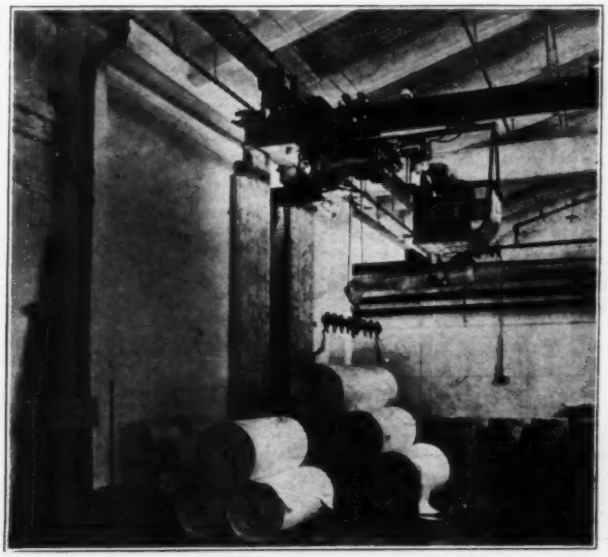


Fig. 29—Electric hoist and monorail

6. Loaders and Unloaders.
   (a) Loaders (conveying, projecting, tilting).
   (b) Unloaders (scrapers, tilting, suction, tower).
7. Winches.
   (b) Power.
8. Accessories.
   (a) Buckets.
   (b) Grapples.
   (c) Baskets.
   (d) Magnets.

CAR PULLERS
—for moving freight cars

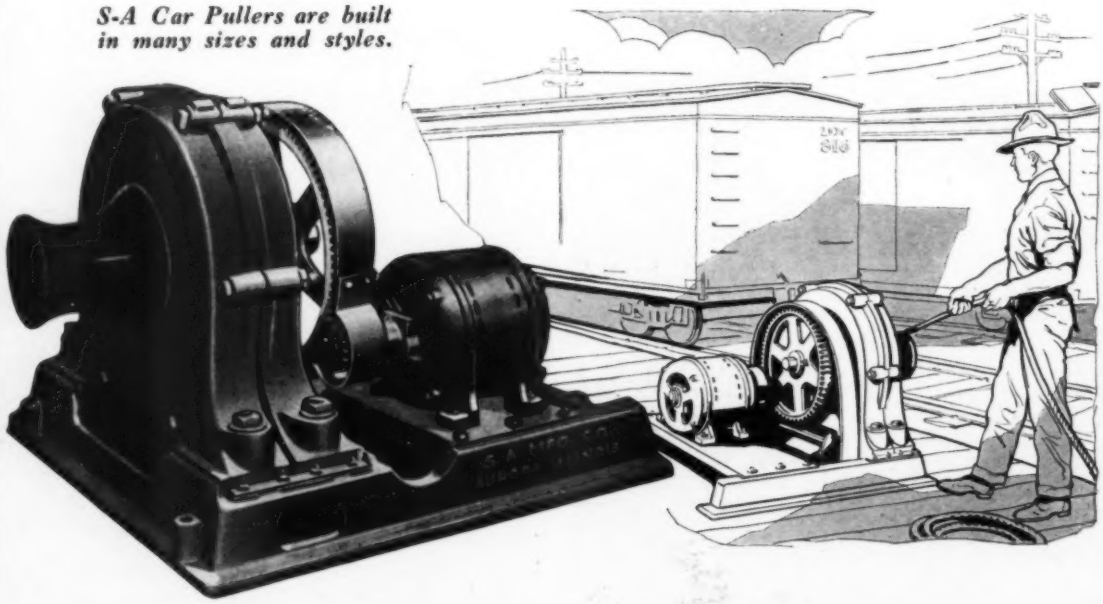
Where empty and loaded cars are to be moved on the track siding, there is definite need for a locomotive or a car puller. Only a few industries have sufficient work to own and use a locomotive, but a car puller may be adapted to the service with an actual saving in the time and labor involved.

One man and an S-A Car Puller easily moves cars on the switch track **where** you want them and **when** you want them.

Write for Data

STEPHENS-ADAMSON MFG. CO., AURORA, ILL.

S-A Car Pullers are built in many sizes and styles.



II. Package handling conveyors and elevators.
  1. Arm handling conveyors and elevators.
  2. Suspended tray elevators.
  3. Push bar and drag elevators and conveyors.
  4. Apron elevators and conveyors.
  5. Belt conveyors and elevators.

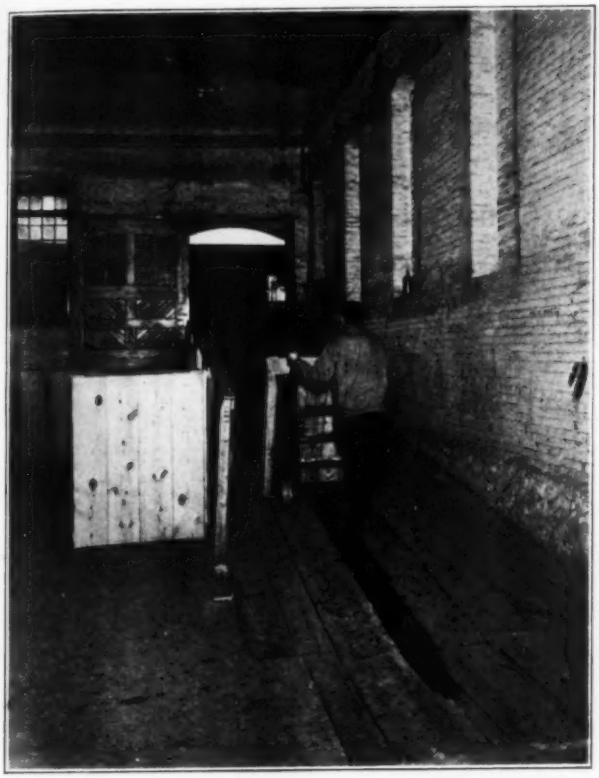


Fig. 30—Truck haul for incline

  6. Gravity roller conveyors and spirals.
  7. Smooth chutes and spirals.
  8. Overhead track conveyors.

III. Loose material conveyors and elevators.
  1. Bucket elevators.
    (a) Centrifugal discharge.
    (b) Perfect discharge.
    (c) Continuous discharge.
  2. Elevator conveyors.
    (a) Gravity discharge.

Fig. 31—Hand lift trucks

    (b) V-bucket.
    (c) Pivoted bucket carrier.
  3. Conveyors.
    (a) Belt.
    (b) Apron and pan.
    (c) Flight and drag.
    (d) Screw or spiral.
    (e) Reciprocating.
    (f) Current (pneumatic, steam jet, hydraulic).

IV. Elevators.
  1. Electric.
  2. Hydraulic and steam hydraulic.
  3. Pneumatic.
  4. Hand power and portable.

V. Trackless transportation.
  1. Hand trucks.
    (a) Lift platform.
  2. Storage battery and gasoline trucks and tractors.
    (a) Lift.
    (b) Platform.

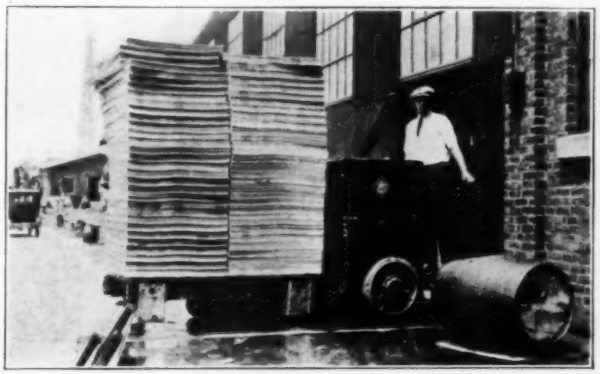


Fig. 32—Electric lift truck

    (c) Dump.
  3. Motor trucks and trailers.
    (a) Demountable bodies.
    (b) Platform and dump.

VI. Industrial rail transportation.
  1. Cars (all types).
  2. Locomotives (all types).

VII. Special coast storage and handling equipment.
  1. Locomotive crane.
  2. Traveling gantry crane.
  3. Belt conveyor.
  4. Overhead.

Handling Material in the Paper Industry

There is a wide application of handling equipment in pulp and paper mills and practically every class and type of handling machinery is used to transport raw and finished materials or stock in process. The principal classes of materials handled are:

1. Coal and ashes.
2. Lime, limestone, sulphur.
3. Pulpwood and logs.
4. Wood chips.
5. Rags and old paper stock.
6. Pulp.
    (a) Slush.
    (b) Lapped or dried.
7. Paper.
8. Materials in machine shop.
9. Supplies, stores and miscellaneous materials.

Coal and Ashes.—One of the most effective and economical methods of handling coal is to dump it from hopper cars (Fig. 8) through the coal crusher to the boiler house. Various types of conveyors are used to handle the coal to the bunkers or the boiler room and some of the most common in use are the pivoted bucket, skip hoist carriers and the flight conveyors (Figs. 7 and 4). The locomotive crane with a clamshell or other special coal handling equipment is often used to good advantage depending on conditions. The coal car dumper (Fig. 9) which unloads the coal by tipping the car upside down is used where a large volume of coal in handled.

The location of most mills makes it necessary to store large quantities of coal. Where the storage facilities are not the best, the cost of moving coal to and from storage is an important item. The locomotive crane (Fig. 15) or the gasoline crane on a caterpillar tractor (Fig. 33) is often used to store coal. A very effective system of handling to and from storage is the drag line scoop conveyor (Fig. 2). Whenever it is

Hidden Values

TO attempt to learn the quality of the products manufactured within the walls of a busy industrial plant by merely looking at the outside would be impossible and ridiculous. No more so, however, than to attempt to judge the dependability of a locomotive crane by merely looking at it.

Far down in the heart of every crane bearing the Brownhoist name lies the secret of its quality and dependability. Built into every part of every Brownhoist is something that even the shrewdest buyer cannot detect by casual observation. This is the careful choice of materials and the precision of design and manufacture.

The Brownhoist name-plate on a locomotive crane is not only a guarantee of fine materials but it also means that to these materials has been added a manufacturing skill of the highest order. Nowhere, on work of this type, will you find more accurate machine work or more exacting care in assembly.

To make locomotive cranes of better quality, greater dependability and a longer useful life are the ideals toward which Brownhoist is constantly working. The measure of success attained is best evidenced by the records for dependability and economy of operation that have been made by Brownhoist cranes on all kinds of work.

If you are interested in the economical handling of materials, just write us.

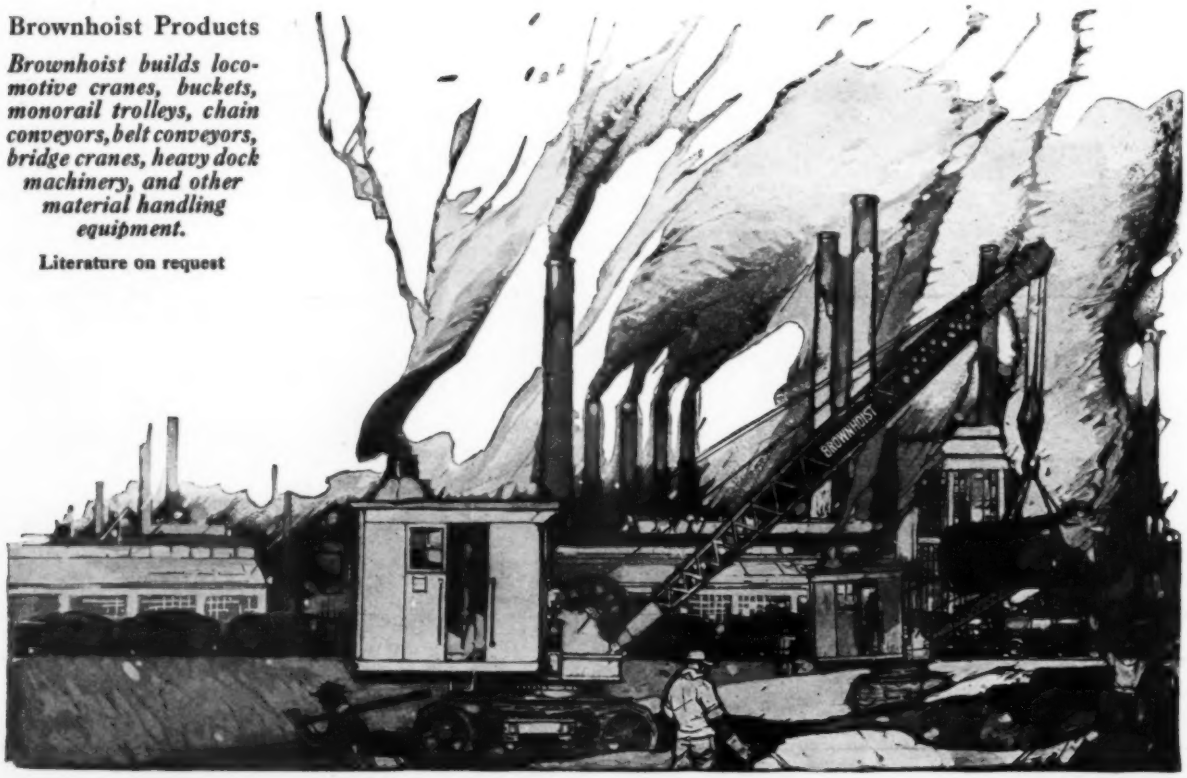
The Brown Hoisting Machinery Co., *Cleveland, Ohio*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

Brownhoist Products

Brownhoist builds locomotive cranes, buckets, monorail trolleys, chain conveyors, belt conveyors, bridge cranes, heavy dock machinery, and other material handling equipment.

Literature on request



BROWNHOIST

MATERIAL HANDLING EQUIPMENT

necessary to load teams, trucks or cars, the portable belt and bucket conveyors (Fig. 10) are very effective. Both gas and electricity power units are available. Many large power plants are equipped with traveling bridges, overhead cableways and other machinery to handle coal. In small plants the belt or the belt and apron conveyor can be used to good advantage.

The trestle is a common and economical method of storing

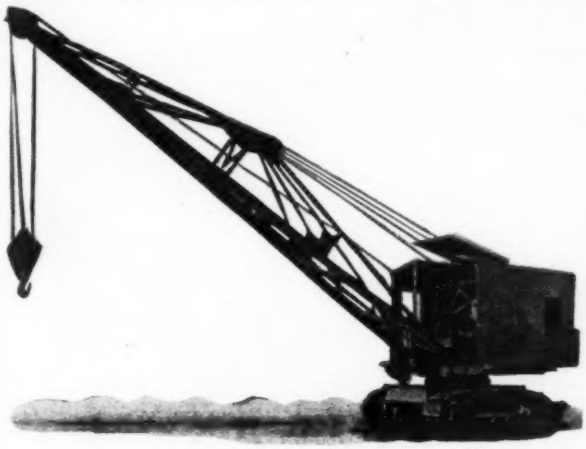


Fig. 33—Caterpillar tractor train

coal when dump bottom cars are available. A belt conveyor system in an underground tunnel may be used to remove the material from storage to the plant. A disadvantage of this system is that coal dumped from a trestle tends to break up and the lumps and fines will become segregated. This produces a condition that may cause spontaneous combustion.

Fig. 34—Jib crane on electric truck

In the handling of ashes the scraper conveyor (Fig. 3) and the pivoted bucket conveyor are effective pieces of equipment. The latter system is often used to carry the coal to the bunkers and also to remove the ashes. Various kinds of other buckets and belt elevators and conveyors are also used to handle ashes.

The steam jet ash conveyor has replaced manual removal of ashes in many old plants with good results. However, the cost of handling ashes by steam is usually more expensive than by good mechanical conveyor system. The removal of ashes by water has been adopted by several power plants. One of the largest and most modern central power stations in the country, the Hell Gate power plant in New York City, uses a hydraulic sluice lined with tile to carry the ashes to the ash pit from which they are loaded into a scow with a clam shell.

The pneumatic handling of ashes is sometimes used with satisfactory results. This requires a large suction fan of special design.

Lime, Limestone and Sulphur.—The local conditions of handling and storing lime, limestone, sulphur and other loose materials require different treatment, although in general, one of the many belt, flight, apron and pan (Fig. 6) or bucket elevators and conveyors can be adapted to the conditions. Limestone may be stored by the trestle system mentioned in connection with coal storage.

If the material is in open top cars, the crane with a clam or orange peel bucket does economical work. Sulphur and lime are usually shipped in box cars and unloading is disagreeable work. The scraper type of unloader is used for some materials and an arm scraper arrangement is also employed. The sugar cane industry uses a car tipping device (Fig. 11) to a large extent in unloading box cars. A similar arrangement might be adopted to handle some of the materials used in the paper industry.

Pulpwood and Logs.—Water transportation is without doubt

Fig. 35—Portable hand crane

the easiest and cheapest method of conveying pulpwood and it is used whenever possible. Many mills are equipped with flumes to convey their 2 or 4 ft. wood to the mill and often to the mill and often deliver the pulpwood into the grinder room by water.

One of the most common and efficient conveyors used for pulpwood is the cable and button type of carrier in a V-shaped

Fig. 36—Portable jib crane

trough (Fig. 21). The size of this conveyor is made to suit the conditions and it may vary from a few feet long to a complete installation 1,000 ft. or more in length, for piling and removing wood from the storage pile. A recent development is the adoption of a cable with welded button attachment that prevents slippage. A majority of these block pile storage systems have two steel or concrete towers with trestles between (Fig. 14) although a recent development is the use

Handle More with Fewer Hands

THE acute labor shortage existing today makes it imperative for every manufacturer employing one or more men for handling material to take immediate steps to cut down mounting labor costs.

Wide experience over a half century has resulted in the development of a complete line of Jeffrey standardized material handling machinery—that solves labor problems permanently in Pulp and Paper Mills—increases production—makes bigger profits.

Pulpwood Stackers; Conveyors; Elevators; Chains and Attachments; Coal and Ashes Handling Equipment; Skip Hoists; Industrial Locomotives, Shredders, etc.

The Jeffrey Manufacturing Company
944-99 North Fourth Street, Columbus, Ohio

New York....2008 Hudson Terminal Bldg.
Chicago.....858 McCormick Bldg.
S.ranton, Pa...518 Union Nat'l Bk. Bldg.
Cleveland, Ohio.....1519 Guardian Bldg.
Denver, Colo. .....1751 Wazee Street
St. Louis, Mo.....606 Pontiac Bldg.
Detroit, Mich. .....455 Book Bldg.
Pittsburgh.....622 Second Ave.
Montreal.....Canada, Power Bldg.
Philadelphia..515 Real Estate Trust Bldg.
Milwaukee, Wis.....M. & M. Bldg.
Boston, Mass. .....141 Milk Street
Los Angeles, Cal..H. W. Hellman Bldg.
Charleston, W. Va.....914 Kanawha St.

JEFFREY
MATERIAL HANDLING MACHINERY

of towers and cable alone and the pulpwood blocks are distended as the block pile grows (Fig. 13).

The single chain drag conveyor with a lug (Fig. 19) is extensively used for short distances and for portable pulpwood conveyors. Multiple chain drag conveyors can handle large quantities of 4 ft. wood in the wood room. The pulpwood stacker which may be stationary or movable (Fig. 16) is usually a chain drag type of conveyor and its use results in a great saving of storage space. The roller chain is an extremely economical type of conveyor equipment and uses less power than the other chain conveyors.

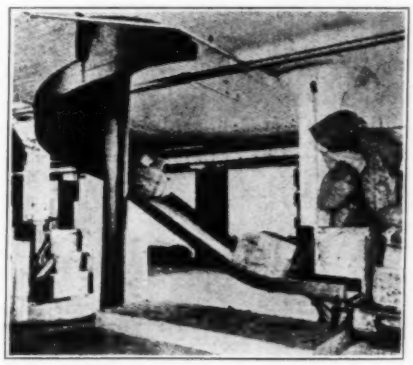


Fig. 37—Spiral chute

Where conditions permit, the chute is extensively used in pulpwood handling and the gravity roller is sometimes applied effectively.

In the groundwood mill small trucks, both track and trackless, are much used to transport the wood but the principal reason for handling it in this manner is to obtain a measurement of the quantity consumed.

A recent development in the handling of 4 and 8 ft. wood and also long logs is the use of a crane equipped with a special wood grappie (Fig. 15). This is especially adapted to loading and unloading open cars and storing the wood or logs in regular piles.

The most common conveyor for handling long logs from the water to the cut-up plant is the jack ladder (Fig. 18) which is one type of arm elevator. Button and chain drag conveyors are also common.

Handling long logs from cars to the storage pile by the cableway is a very effective method. Cranes and derricks are often used but the range of piling is not usually as great as that of the cableway. If double tracks are used the locomotive crane has a wider range and a minimum of switching is required. Button cable and chain drag conveyors are used to a limited extent. The gantry crane is largely used in European countries with considerable success in pulpwood handling to and from storage.

Wood Chips.—An effective method of conveying wood chips is by a wide belt conveyor (Fig. 23). Due to plant conditions, it is sometimes necessary to lift the chips from the wood room to a considerable height by a bucket elevator of the centrifugal discharge type (Fig. 5). This method is often used together with the belt conveyor and is very effective. Chain and drag conveyors, as well as screw conveyors are sometimes used for short distance as is also a special type of large link scraper chain. Some mills use a fan and pipe to move the chips to the loft. A disadvantage of this is the breaking of the chips resulting in sawdust.

Rags and Old Paper Stock.—Rags and old paper stock usually come to the mill in bales and a large number of package handling conveyors and elevators are in use. The various types of push-bar, drag and apron conveyors and elevators are adapted to meet the conditions. (Fig. 25) illustrates the apron type of conveyor.

Gravity roller conveyors and straight or spiral chutes. (Fig. 37) can often be effectively used to lower bales and other package materials.

The overhead track conveyor with a hoist is sometimes used to handle bales or barrels under particular circumstances. The electric truck with a lift is used to reduce the number of hand and box trucks that are used to large extent in handling stock throughout the mill because the materials in process are moved more rapidly.

A belt or apron conveyor is often used in the sorting of rags and book stock and air is sometimes employed to handle the sorted and dusted material.

Pulp (Slush).—Pumping stock in slush form is probably the most economical method of handling pulp. With the methods and equipment now available for controlling and measuring deckered slush stock it is possible to get as correct quantities and proportions as it is with lapped stock which is weighed on platform scales and corrected for moisture.

Most mills use the hydraulic method of conveying pulp wherever possible. It is feasible to pump stock of a density up to 6 per cent but pulps of higher consistency require more power. Slush pulp of low consistency is now being pumped 2 to 3 miles and in one new project it is planned to pump it a distance of approximately 9 miles. However it is important to use pumps especially designed for the work to get good results. Modern newsprint mills have complete slush systems and no lapped pulp is used. This has made an appreciable saving in the cost of manufacturing paper.

The worm or screw conveyor is effectively used for stock of high density and for short distances under certain conditions. The ordinary bucket elevator is also employed in a number of cases.

Pulp (Lapped).—The handling and storage of lapped pulp presents one of the most costly and complicated of all transportation problems in many mills. Much hand labor is necessary in piling and trucking the lapped stock to and from the storage pile into the paper mill where it is used.

The more general use of the lift truck (Figs. 31 and 32) both hand and power, together with platforms, has eliminated much rehandling of laps. The platform is a great labor saver Several mills ship pulp on platforms and have them returned thus eliminating the loading and unloading of the box cars.

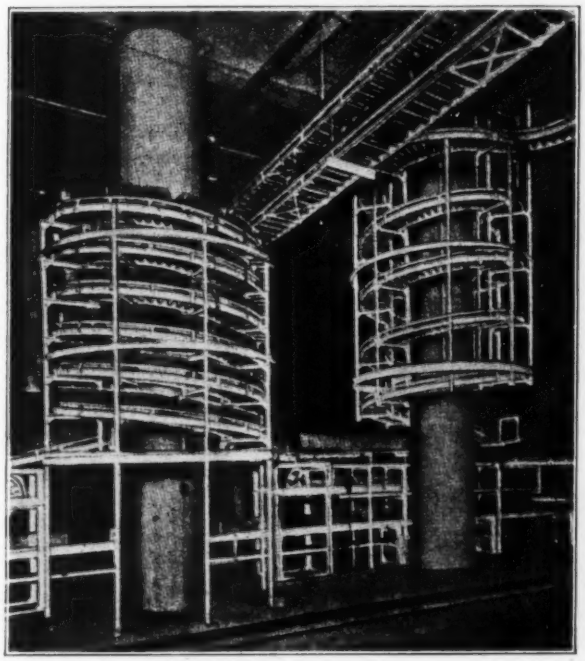


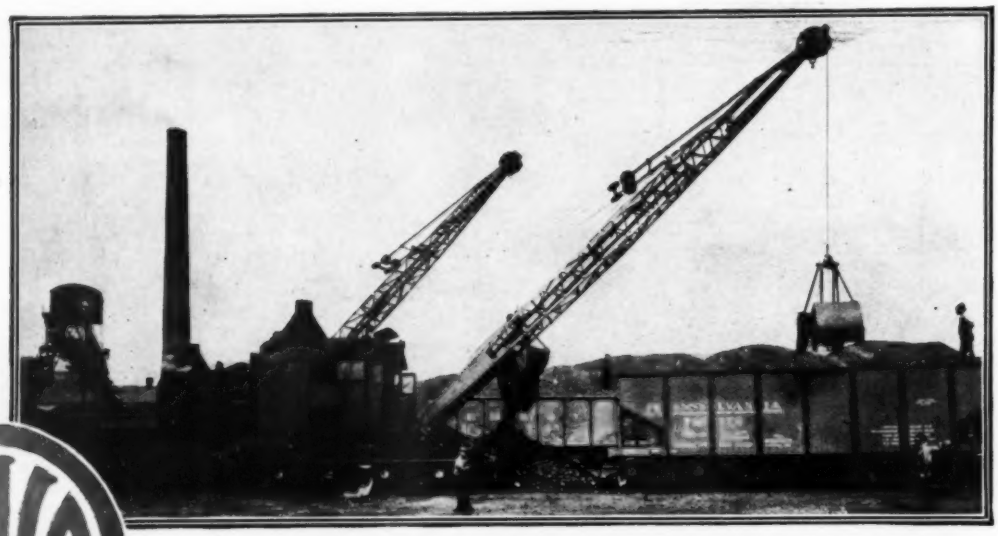
Fig. 38—Spiral conveyor

The platform is sometimes used in combination with the mororail hoist and telpher (Fig. 29) and sometimes the cable tramway is used to good advantage.

The various package handling conveyors and elevators are extensively used to handle laps. Perhaps the simplest is the belt conveyor (Fig. 22) which is often equipped with push bars. Various types of apron elevators and conveyors (Fig. 39) are used to a large extent both in the storage piles and in the mills. The gravity roller (Fig. 22) is a very effective conveyor on a pulp pile and for short distances in the mill. It is flexible because it comes in sections that can be moved as desired. The smooth chute is applicable and the lowering of pulp and other materials from one floor to another is effectively done by both the chute and gravity roller spiral (Fig. 38).

The various conveyor systems used to some extent for lapped pulp can be used for dry sheets and baled pulp. In addition the various types of cranes, cableways and hoists may be adapted to handle the material at a minimum cost.

Paper.—The hand truck is largely used to transport rolls



CEIC

Browning and— Cleveland Illuminating

WHERE the light and power of a huge metropolitan center are generated, equipment insuring greatest efficiency and economy of operation is vital. The Cleveland Electric Illuminating Co., one of the largest and most skillfully managed plants, is noted for its remarkable efficiency in both power and maintenance divisions. No detail is neglected that will lower operation costs or increase operating efficiency.

To handle the hundreds of thousands of tons of coal necessary to generate the vast amount of power produced, Browning Locomotive Cranes were selected. In unloading and spotting cars, in the storage yard and in fact wherever the coal of this company is handled, Browning Cranes are bearing their share of the burdens, making profits for the stockholders.

Industries of every character where heavy materials must be handled, find Browning Locomotive Cranes dependable, efficient and economical.

Let our engineers show you how Brownings will save money for you just as they are doing for The Cleveland Electric Illuminating Co. and hundreds of others of the country's leading industries.

THE BROWNING COMPANY

New York CLEVELAND, OHIO, U. S. A. Chicago

Sales Agents:

SEATTLE SALT LAKE CITY SAN FRANCISCO WASHINGTON, D. C.
PORTLAND LOS ANGELES MONTREAL BIRMINGHAM

BROWNING
LOCOMOTIVE CRANES

of paper although the electric truck (Fig. 28) is supplanting it in large mills and saves time and labor. Rolls are also handled in the mill and sometimes to the cars by various types of chain, pneumatic and electric hoists on an overhead track (Fig. 27). One mill on tidewater uses the monorail and telpher (Fig. 29) to transport newsprint rolls from the mill to the hold of the ship.

The industrial rail method of transportation together with the electric or pneumatic hoist move rolls from one department to another. Small hand and power cars are built to carry the rolls and the loading and unloading platforms are the same height to facilitate the transfer of the rolls.

Power elevators are in common use where it is necessary to lift rolls for storage or shipping and the inclined cableway elevator on tracks is used to convey rolls up a long incline.

Sheet paper and small rolls are usually handled by equipment similar to that used to transport rolls. The various package handling conveyors are used whenever conditions permit.

The hand and power lift truck with platforms (Figs. 31 and 32) is also used both to handle sheets and bundles in the mill and often employed to load cars.

Power trucks and tractors with trailers are effectively used to transport paper between plants or to storage. The demountable body is applicable to handling some commodities.

Materials in Machine Shop.—Many kinds of materials are handled in the repair departments of a paper mill and equipment must be developed to suit the conditions.

The chain hoist is probably the most common and effective handling equipment and is used for many purposes. The overhead traveling crane is an important piece of equipment in handling heavy repair parts.

Electric and pneumatic hoists are used for small parts and when combined with an overhead track are effective and flexible handling machines. Gantry and job cranes (Figs. 34 and 36) are often used to advantage and a small portable derrick (Fig. 35) is sometimes very effective in moving machine parts. A hand or power winch can be used under some conditions.

The hand truck and special push trucks for press rolls, etc., are indispensable in the machine room and machine shop. The industrial power truck can also be used in many cases

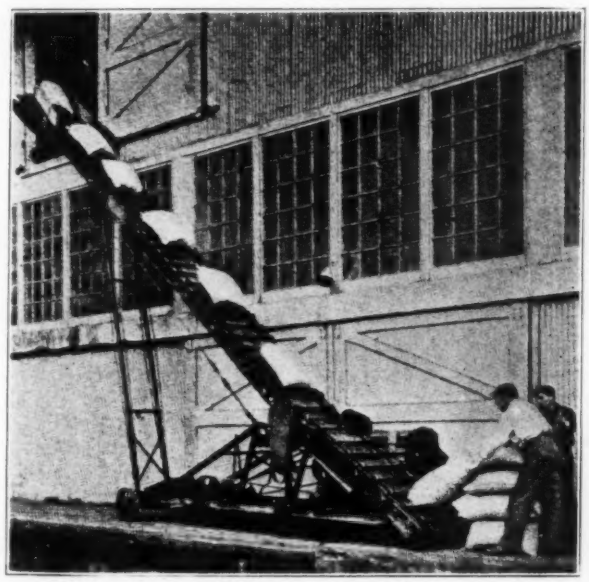


Fig. 39—Portable apron conveyor

to move materials, both large and small, with a great saving of time and labor.

Miscellaneous Materials.—The movement of supplies, stores and miscellaneous materials in a pulp mill is a distinct problem at every plant depending upon the commodity and location of the storage space.

Much small material is handled by the regular automobile trucks when the hauls are sufficiently long. The industrial power truck with the platform lift is also a very convenient piece of equipment. The traveling crane and the hoist with the overhead track is applicable for many purposes. The hand truck is indispensable in moving all kinds of materials and the portable elevator (Fig. 26) is very effective in piling barrels, bags, boxes, etc., in the store room.

Conclusion

A marked advance in the mechanical handling of materials has been made in the past ten years. This mechanical development will, doubtless, continue not only because of the reduction in costs and the lessening of labor but also to eliminate the wasteful use of human energy wherever it is possible to do the same work as economically by mechanical means. Human energy, in the last analysis, expresses itself

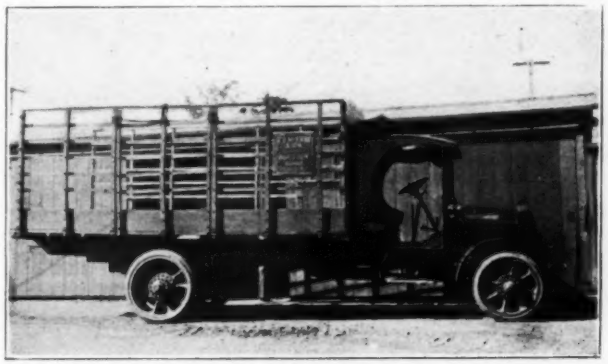


Fig. 40—Motor truck

in thinking and it is unintelligent to put it to use where its accomplishment is mainly measured in foot pounds.

References: "Cyclopedia of Handling Materials," Zimmerman's "Mechanical Handling of Materials," Management Engineering, Industrial Management.

In order to illustrate the different types of conveying apparatus, photos, cuts and other reproductions have been used and we are indebted to the following companies for their use: American Hoist and Derrick Company, Barrett-Cravens Company, Baker Electric Company, R. H. Beaumont, Brown Hoisting Machinery Company, Brown Conveyor Company, Cleveland Crane and Engineering Company, Cowan Truck Company, Elwell-Parker Company, Great Northern Paper Company, Haiss Manufacturing Company, Ingersoll Rand Company, Jeffrey Manufacturing Company, Laurentide Company, Lamson Company, Lidgerwood Manufacturing Company, Link Belt Company, Nekoosa-Edwards Paper Company, Pawling & Harnischfeger, Revolvator Company, Shepard Electric Crane Company, Standard Conveyor Company, Louden Machinery Company, Stephens-Adamson Company. Other pictures were taken by the staff photographer of THE PAPER INDUSTRY.

R. B. Wolf, Chairman; G. D. Bearce, Vice Chairman; W. G. MacNaughton, Secretary; O. L. Berger, H. P. Carruth, P. K. Fletcher, H. H. Hanson, F. R. Hyatt, H. O. Keay, Ernst Mahler, F. J. Morrison, H. F. Obermanns, J. E. Plumstead, R. B. Robertson, J. D. Rue, H. S. Taylor, Committee on Waste of the Technical Association of the Pulp and Paper Industry.

Engine-Room Pointers

Reducing valves that are too large for the amount of steam they are to pass are usually unsatisfactory. Either they will open and close continually and chatter violently, or will stand in a position nearly closed and become steam-cut and leaky. It is more satisfactory to use two small valves in parallel, one set slightly heavier than the other, so that one will supply steam up to its maximum capacity before the other opens.

Another way is to use one reducing valve equal to about one-half the maximum demand, and a bypass of about the same capacity with a hand-operated valve in it, so that when the reducing valve reaches its capacity the bypass valve may be opened wide and the reducing valve will close down and simply make up the shortage. This, of course, requires that an attendant shall observe the pressure gage occasionally.

A governor is said to be stable when it assumes a definite position for each particular speed and when a change of speed is necessary for a change of position, while a governor which is in equilibrium at but one speed is said to be isochronous. Perfect isochronism would be impractical as the slightest increase in speed above the normal would result in cutting off the steam, accompanied by a sudden decrease of speed, following which the steam valve would open wide, thus giving rise to extreme fluctuations.

Robins Conveying Systems

FOR HANDLING BULK MATERIALS

Write for Handbook of Conveyor Practice

ROBINS CONVEYING BELT COMPANY

New York Chicago Pittsburgh Boston

NORTHERN CRANES AND HOISTS

NORTHERN ENGINEERING WORKS
DETROIT, MICHIGAN

Ticonderoga Machine Works

TICONDEROGA, N. Y., U. S. A.

MANUFACTURERS OF

WARREN IMPROVED CALENDER DOCTORS

With Flexible Blades, Universal Adjustment and Control
(PATENTED)

WARREN IMPROVED PATENT DOUBLE DRUM WINDERS

Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties

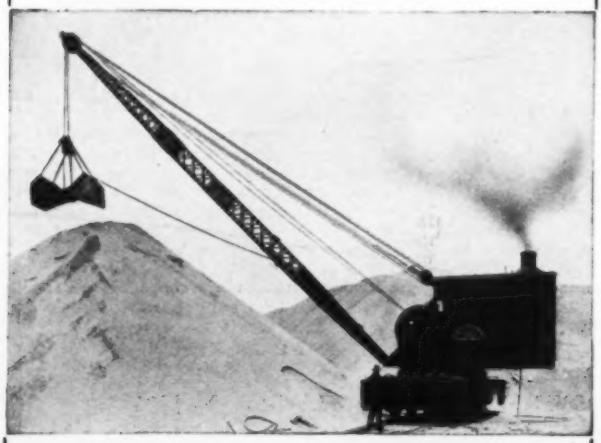
SEND FOR OUR BULLETIN

O. S. Dependable Cranes

Indispensable for the rapid and economical handling of materials.

Capacities, 7 to 60 Tons

Write for Catalogues 18 and 21



Orton & Steinbrenner Co.

Offices CHICAGO, ILL.

Shops HUNTINGTON, IND.

Branch Offices in all Principal Cities

Easiest Method Proves to Be Cheapest

Many an engineer, upon seeing an installation of our equipment for the first time, has wondered why he did not think of such a system himself—it's so simple.

And yet its very simplicity has revolutionized the entire coal handling industry and established a new minimum in power and labor costs.

The **Godfrey System** is simple for the reason that it follows the line of least resistance. Instead of forcing its way into the pile, it allows the coal to flow of its own accord by utilizing the law of gravity. When thus filled, the Godfrey bucket is raised and conveyed to the point of unloading where it automatically discharges its contents.

One man can unload and store a fifty-ton car of coal in an hour and a half with the **Godfrey Conveyor,** at a power and labor cost of from five to seven cents a ton, to say nothing of the saving in demurrage charges and freedom from labor difficulties.

If you use coal or similar materials in carload lots, it will pay you to install a **Godfrey Conveyor,** regardless of what your tonnage may be. Make us prove it.

Ask for Bulletin A-1

GODFREY CONVEYOR COMPANY

Elkhart, Indiana, U. S. A.

Branches
Philadelphia, 736 Drexel Bldg.
Pittsburgh, 601 Columbia Bank Bldg.

The Metering of Paper Mill Slush Stock

By E. J. TRIMBEY

AMONG the many labor-saving and cost-reducing improvements and refinements which have been introduced into paper mills during the past years, none have been more important than the change from the use of "lap" pulp to the so-called "slush" stock method of handling.

Lap pulp and beaters made an expensive method of utilizing the product of the pulp mill in the paper mill especially in those mills making their own pulp and making grades of paper where a real beating action was not essential and where the beaters were used simply as a means of reducing the pressed pulp to the fluid state and mixing the proper amounts of the different ingredients.

While the use of soft stock pumped from the storage chests to the beaters or mixing tanks saved much labor, it was not entirely satisfactory due to the fact that it was impossible for the decker men to keep the stock of a uniform consistency, and any variations in the consistency meant a corresponding variation in the proportions of the ingredients and in the running conditions on the paper machines as well as variations in quality and the cost of the raw materials used. With the advent of the Automatic Consistency Regulator, a number of years ago most of these disadvantages were eliminated as it was found that the consistency regulators could be depended upon to control the consistency of soft stock as it was being pumped and keep it within as close limits as the variation in the moisture tests of "lap" pulp from wet machines.

With the variations in the consistency of the stock supply thus automatically taken care of, the one remaining variable quantity was the personal equation of the man in charge of the beaters or mixing tanks, for the volumetric quantities of the different pulps were controlled by him and there was no practical method of checking up exactly how much was used of each kind of pulp in the different charges or batches, and the industry has been on the lookout for some practical and satisfactory method of mechanically controlling the furnish and also recording the amounts used, that they might have a means of checking up the amount of pulp actually used as compared with the paper made.

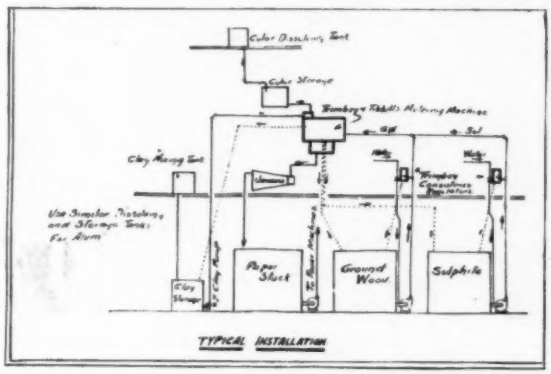
A proportioning and metering system especially applicable to newsprint mills or to mills on similar grades of paper, has now been developed and is being used in a number of the representative mills of the United States and Canada and one is now being installed in one of the largest paper mills in Finland.

The apparatus used with this system is simple and practical, and excellent results are being reported by the mills using it. Automatic Consistency Regulators are used to control the consistency of both the ground wood and the sulphite as they are pumped to the supply compartments for the meters. The meters consist of cylindrical brass castings machined to size, fitted with four-arm rotors and mounted at the side of the stock compartments with their axes vertical. On the filling and discharge sides the cylinders are open for nearly one-fourth their circumference, giving ample filling and dumping spaces. Provision is made for eliminating the chances of air bubbles or pockets of entrapped air from displacing stock and thus introducing errors into the calculations of the amounts of pulp used.

The stock meters are mechanically geared together with a simple and ready means of changing the relative speeds when it is desired to change the stock proportions. Smaller meters of a similar construction are used for solutions of color, alum, size and clay and these too are geared together and to the stock meters, while adjustable gates on these solution meters provide for changing the proportions of any of these liquid ingredients without shutting down the system or changing the other proportions. Float valves of a special design are used for controlling the admission of stock, and float valves are also used for controlling the supply of solutions to their respective meters. Recording counters attached to the stock meters give a record of the number of revolutions in a given period and since each revolution means the passage of exactly so much volume and the Automatic Consistency Regulators insure a definite dry weight per unit volume, an accurate record of the dry weight of each kind of pulp used is obtained for checking up the costs, yields per cord, losses, etc. A variable speed motor is used to drive the series of meters and by shifting the controller the total output can be regulated to meet the requirements of the paper machines supplied by it.

When the stock is entirely de-fibred and flakes of pulp need not be guarded against many mills have discontinued the use of the Jordans on newsprint. When the Jordans are not used, the metering system can deliver its mixed stock into the machine chest and so do away with the necessity of operating both a Jordan pump and a machine pump. Where the Jordans are still used, the system can be elevated a few feet and deliver its stock to the Jordan and from thence to the machine chest.

The accompanying figure shows a typical installation of this metering system where the Jordan is used. Stock from both the ground wood and the sulphite supply tanks is pumped to the metering machine, samples being drawn off from each line to supply the Automatic Consistency Regulators. The stock passing through the regulators returns to the chest and the necessary amount of thinning water is added to the



suction side of the pump where it mixes with the entire amount of pulp going through the pump and reduces it to the desired consistency. If desired, for re-circulation purposes, a small overflow can be maintained from the meter compartments back to their respective chests. Exactly proportional parts of all ingredients are metered out and dumped together in small batches and flow either to the Jordan or to the chest. The recording counters giving a record of the amounts used.

This system gives a uniform mixture to the paper machines and one which is always the same and of uniform consistency, thus aiding materially in promoting maximum production and uniform weights and quality. It saves a large amount of power due to the elimination of some repumping, the use of power-consuming agitators and to the fact that with small batches being measured out at a uniform rate there is a more even load on the pumps and smaller pumps can be used. The labor item is materially reduced, especially in mills which are now using beaters, in one three machine mill the labor saving will be twenty-seven men per day. With less equipment in operation the maintenance costs of this end of the mill are materially reduced and there are also savings in floor space, this is always acceptable in an old mill and materially reduces the first costs in a new mill.

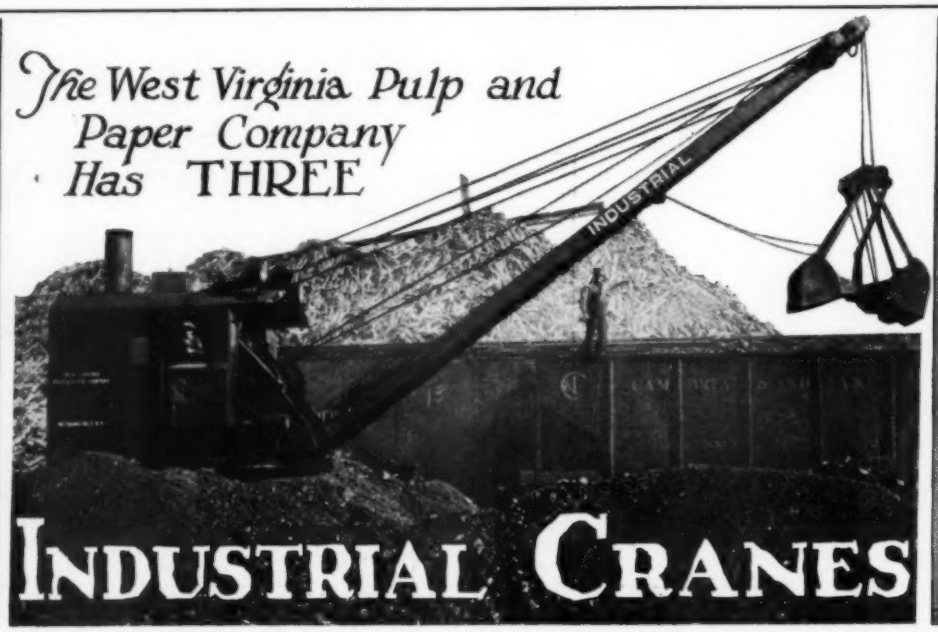
One of the recent installations of this system was at the new mill of the Bathurst Co., Ltd., who report as follows: "You will be glad to know that the consistencies are holding very well from day to day now that the stock to the regulators is being controlled regularly above the required thickness. For two or three weeks past we have made daily calculations of ground wood and sulphite used as per meter calculations, and have compared the tonnage figures with the amount of newsprint paper produced, independent of cores and wrappers. With the exception of a couple of days the total furnish of air dry pulp figured on the average about 5% or 6% higher than the paper produced, which looks just about what it should be. Of course the ratio varies a few per cent up and down from day to day, depending on the variation in level of the machine chest, but the results are near enough to give us considerable confidence in the accuracy of the metering system."

From the operating standpoint the advantages of this system are:

Exact and uniform proportions; constant uniform consistency; recording the amounts used: ease of changing proportions when desired; variation of total output without changing proportions; improved running conditions on the paper machines; improved quality of paper made.

From the financial standpoint the advantages are: Savings in power; labor; floor space; first cost and maintenance.

The West Virginia Pulp and Paper Company Has THREE



INDUSTRIAL CRANES

Of course, in the paper and pulp field, INDUSTRIAL'S big savings are made in handling pulp wood and logs with grapple, coal and other bulk materials.

At the Mechanicville plant of the West Va. Pulp and Paper Co., in addition to these operations and handling sulphur and clay, their INDUSTRIALS during big winter storms clear the way and keep the mill going.

INDUSTRIAL WORKS **Bay City, Mich.**

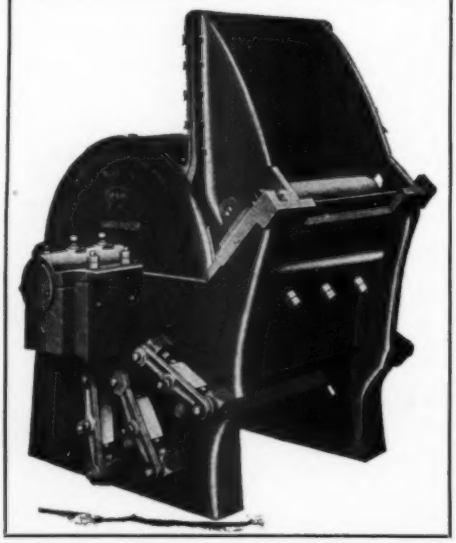
NEW YORK CHICAGO PHILADELPHIA DETROIT

MITTS & MERRILL GRAVITY FEED SHREDDER

Reduces Paper Stock

Magazines, books, old paper and boxboard, frozen or dried pulp laps run through the Mitts & Merrill Gravity Feed Shredder are reduced to particles which hydrate readily when put into the beaters.

Built in six sizes with spouts ranging from 18" to 45" wide



Reduces Costs

Because shredding in the Mitts & Merrill Gravity Feed Shredder expedites hydration in the beaters there is considerable saving made in power. Thus we see that the shredder here illustrated reduces costs while it is reducing paper stock.

We will be glad to furnish details upon request.

We also build a 100% efficient "Hog" to reduce pulp mill bark and wood refuse

MITTS & MERRILL 1013 Tilden St. **SAGINAW, MICH.**

New Style of Monorail Hoist

A one man crane, for the handling of large rolls of felt and paper, has been installed at one of the mills of The Paraffine Companies, Inc., of San Francisco, Calif. This crane was originally designed by the Paraffine Companies and has proven successful in the operation of carrying paper and felts to and from its storage warehouse.

The crane is operated by four buttons, in the hands of the operator, which are connected to the motor on the overhead by an insulated wire cable. A seat is built for the operator, who rides along with the roll, as shown in the photograph herewith. The crane is provided with a pair of heavy jaws which engage the core of the roll and which are opened and closed by means of a lever. As soon as the crane operator lowers a roll to the floor, he releases the jaws from the core by manipulating this lever.

Bolted to the roof trusses is a series of I-beams, which extend lengthwise of the warehouse, as shown in the illustration. These I-beams act as an overhead track for the crane, enabling the crane operator to deposit or pick up a roll at any point in the warehouse. Extending across the end of the warehouse are two tracks over which a second crane

operates, by means of which the one-man crane can be transferred from one I-beam to another. Both cranes are controlled by the one operator.

The crane is equipped with a safety device, so that it is impossible for it to run off the I-beams when being transferred from one to another, or when being transferred from the I-beams to the second crane.

The Electric Truck in the Paper Mill

A material handling power unit that has proved successful in many different industries of varying transportation requirements is the "Trackless Train," an electric truck made by the Mercury Manufacturing Company of Chicago.

In applying this truck to the uses of the paper mill, there are many different jobs for which it can be used. While the editor was attending the recent Joint Convention held in Appleton, Wis., he made a short visit to the Kimberly-Clark Paper Company, of Kimberly, Wis. This company has one of these trucks which it uses for the sole purpose of conveying pulp laps from five wet machines to the storeroom. Three men are all that is necessary for this operation, two in the storeroom and one who operates the truck. A photograph taken of this truck in operation is shown herewith.

They have a number of trailers, as shown in the photograph, one of which is constantly alongside each of the five wet machines. The electric truck acts like a switch engine, hauling the trailer away from the wet machine when it is loaded with pulp laps, at the same time bringing an empty trailer with it to be filled. This empty trailer is taken from the storeroom, so no motion is lost. All the truck does is to go from the wet machines with a full truck to the scales and then the storeroom, where it unhooks the loaded truck

and hooks on an empty one, which it takes back to the wet machines and exchanges it for a loaded one again.

Bulletin No. 106, just issued by the manufacturer, describes the Type "H" tractor in detail. Copies are available on request.

Snow Motor That Has Proved Practicable

In our October issue, we gave a brief description of a two-reel motion picture taken of the Armstead Snow Motor, which was shown at the Woodlands Section meeting of the American Paper and Pulp Association conference, recently held in Chicago. As this new invention has universally attracted considerable notice, we believe that it is justifiable at this time, to give a more complete account of this motor and its accomplishments.

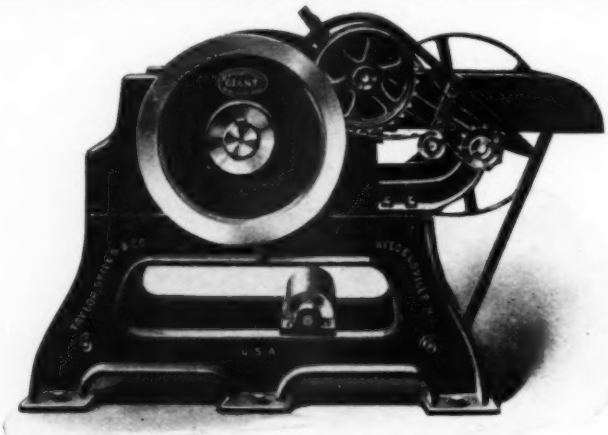
When winter comes, bringing its heavy blanket of snow, the problem of transportation has in the past, always been a difficult one to solve. Especially so in the paper industry—in the difficulties encountered in transporting pulpwood from forest to railroad or river, through the heavy drifts of snow, that are frequent occurrences in the lumber districts of the north.

Numerous inventions have been patented in attempting to solve this problem of transportation over snow and ice. Some of them have used the principle of aeroplane propellers; others have spiked sprocket-wheels which grip the road in the rear of the sled. Caterpillar tractors have also been used as a motive agency.

F. R. Burch, a retired Alaskan miner, living in Seattle, Wash., is the man to be given credit for this new principle in automotive traction. For a long time, he has given considerable thought to the problem of how to overcome the difficulties of transportation over the deep snow banks in Alaska. In the last three years he has built several machines of this type, which were tested extensively in the states of Washington and Oregon. Col. Armstead, who is now the president of the company manufacturing these motors, came into contact with the motor Burch had built and after seeing it successfully demonstrated, at once saw the great possibilities in store for it. He acquired control of the patents, which Burch had obtained and has, with several others, developed it to its present state of perfection.

New Principle in Propulsion

The principle involved is that of compacting the snow under the treads of the machine by means of revolving, torpedo-like rollers, which are moved in the direction of their axes. Propulsive effort is secured by helical knives or "skates," which are mounted on the drum surfaces. Practically speaking, therefore, compression of the roadway is secured by a combination of plow and runner effects, while traction is developed by applying the well-known principle of the Archimedean screw.



RAG CUTTERS

Whatever You Cut, a GIANT Will Solve Your Problem

LET US FIGURE IT OUT FOR YOU

Taylor, Stiles & Co., Riegelsville, N. J., U.S.A.

WATEROUS ENGINE WORKS
Brantford, Ont., Canada
Canadian Representatives

R. J. MARX
133 Finsbury Pavement, London E. C.
Sole Agents for Europe

"HALLOWELL" Steel Lift Truck Platform

Pat's Pending

The "Hallowell' Runners are constructed of heavy angle steel to which are attached steel leg holders of a special and substantial design. These parts are joined by large rivets, hydraulically driven, a method which prevents any possibility of their working loose.

This detail of construction is of vast importance as unless the legs are rigidly and permanently attached to the runners they will gradually become wobbly and unreliable, occasionally collapsing.

The "Hallowell" joints remain tight—they cannot do otherwise.
This and other features, along with its low initial cost, combine to make the "Hallowell" a very interesting proposition.

Manufactured by

Standard Pressed Steel Co., Jenkintown, Pa.

The "Pioneer" Steel Hanger people

The particular advantage claimed for this, as contrasted with other systems, is that it utilizes the compact snow for traction, the power application being absolutely uniform

and practically with "screw slip." Drums on opposite sides revolve in opposite directions, the helix of one set of knives being clockwise and the other counter-clockwise. This avoids any tendency to orientation and permits steering with equal facility to right or left. Opposing rotation of the drums also prevents the machine from traveling obliquely, as it would obviously tend to do if the drums turned in the same direction.

The body of the car resembles that of the ordinary automobile; in fact, it contains a similar gas engine (55 H. P. Liberty motor), transmission gears, and chassis. It rests upon a 4-in. steel tube with trunnions placed between the driving drums so that they can have motion around the tube. The drums have a curved supporting truss which preserves their alignment and gives them vertical flexibility. The leading bobsled runners are also jointed to provide easy riding and flexibility. No springs are required, as the machine glides evenly over the smooth snow.

Steering is effected by means of a rudder sled in front, which supports just enough weight to give it the necessary directing force when deflected from the straight course. The speed of the machine depends, of course, upon its design and the conditions under which it operates. On flat icy surfaces it has made a speed of 23 miles an hour.

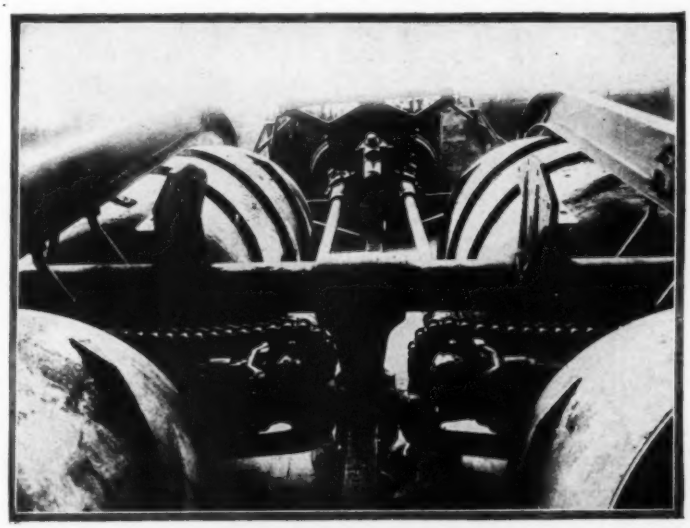
Successful in All Tests

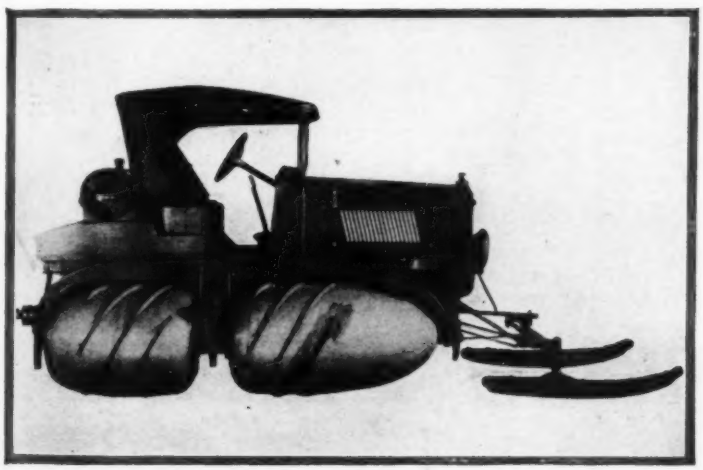
During the last three years, the snow motor has been subjected to many tests to determine its ability in actual working conditions. At the camp of the Collins Lumber Co., Pine Lake, Wis., it was used ten days in logging operations and handled larger loads than the teams. In one special test, four sleds bearing logs estimated to weigh over eighty tons were connected in tandem on a level stretch of road, and the snow motor was used to start and move this cumbersome load.

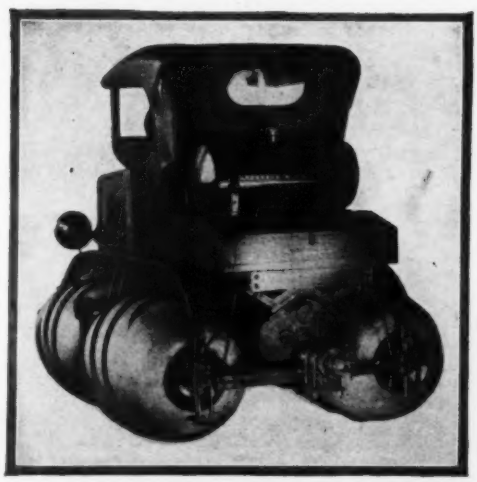
Another spectacular test was conducted in Ironwood, Mich., in March, 1921, and consisted in hauling nine double bobsleds loaded with 450 men and boys over the streets of the city. The snow motor also demonstrated its usefulness in breaking roads over unpacked snow. The large diameter of the drums furnishes such a wide bearing surface that the machine only sinks about 8 in. in soft snow, leaving two U-shaped tracks, which can be used by any teams following it.

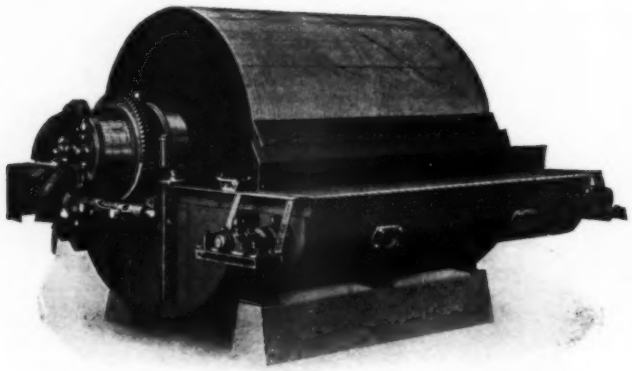
The Armstead Snow Motors Company, Inc., of Detroit, Mich., now has a program which includes the construction of three machines for demonstration purposes during the coming winter. One is to be employed in Maine, in connection with certain large pulpwood operations in that state. Another is going into a Wisconsin lumber tract. The third will be operated in hauling out the product of a lead mine in Idaho.

From all the successful tests made of this motor in actual working conditions, in city and forest, it is to be seen that the principle of this machine is right, and that it will undoubtedly play an important part in the future winter logging operations of the paper industry.









OLIVER CONTINUOUS FILTER WITH REPULPER

The ancient Chinese —*who invented paper, would have had* no use for the Oliver

—but their conditions of competitive quantity production were not as severe as are yours now.

Oliver Continuous Filters are for those paper manufacturers who intend to keep at the forefront of *up-to-the-minute economical paper production;*—who intend *to meet and to best competition* where it can be most easily combated—in the mill, *where costs are made.*

Oliver Continuous Filters stop *continuous losses* and *make continuous gains* by

1. Washing wood pulp direct from the digestors.
2. Thickening wood pulp before bleaching.
3. Serving as a decker save-all to remove fibre and filler from the white water.
4. Handling lime mud in causticizing.

Proved in 20 mills---send for the data

Oliver *Continuous* Filter Co.

San Francisco
503 Market St.

New York
33 W. 42nd St.

London
11-13 Southampton Row, W. C.

Michigan

Kalamazoo, Mich., Nov. 1, 1923.

The Michigan Division of the American Pulp and Paper Mill Superintendents held their regular meeting Wednesday evening, October 24th. At this meeting, Mr. F. A. Smith, of the Sorg Paper Co., Middletown, O., spoke on "What I Saw in the Paper Mills of Europe."

He stated that the tendency was to have small beaters and lots of them. The average beater was 300 pounds. Very few mills had Jordans, this work being done by the beaters. Their equipment was old and the speed was low, but they made their money by watching small things. Labor was very cheap, so they can employ men to pick over stock, which in this country would run the cost up to an enormous figure.

Extensive improvements are being made at the Superior Division of the Bryant Paper Company. A new roof is now being put on the beater room. A complete system of cooking and washing paper is being installed. (This is a new system to this part of the country.) A complete new beater room is in process of building. In a short time the mill is going down, while these alterations will be installed. At the same time, this division will be completely electrized, getting the power from the new power house, now being erected. R. D. Boyer is the general contractor for the construction of the buildings necessary for these improvements.

Mr. F. M. Hodge, president of the Kalamazoo Paper Co., and graduate of Kalamazoo College, in the class of 1880, gave a talk to the students of the Economics Department of Kalamazoo College, on Friday, October 19th, on the manufacture of paper. He invited the department to visit his mill, which they took advantage of. About seventy-five were in the party. Mr. Hodge divided these up into four groups, and explained each process in detail, by means of four guides. When the trip was completed, the students gathered in front of the office and gave three rousing cheers for Mr. Hodge.

Mr. Rutz, Chief Engineer of the Bryant Paper Co., states that the power house, now under construction at their mill, will be able to supply steam to the Bryant Division the last of November. This power house contains four 770 horse power boilers. These will take the place of twenty-six boilers they now have in the Bryant, Superior and Imperial Divisions. They are not planning on supplying the Milham with power at present.

Mr. Frank Monahan, formerly connected with the Bagley & Sewell Co., is now the superintendent for the new mill under construction for the Kalamazoo Vegetable Parchment Co. They expect to start the machine in this plant the first of November. Everything is now ready, but, owing to the scarcity of water at the new plant, it cannot be operated until this is remedied.

John Byrnes, President of the Folding Box Manufacturers' Association, which held a convention in Kalamazoo, October 17, 18 and 19, states: "In spite of the wet days, we had a larger turn-out than we expected. All the committee did good work. The transportation committee in charge of F. W. Sutherland, saw to it that the mills were accessible to all."

Mr. Gilman, of the Bryant Paper Co., Mr. Harter, of the Rex Paper Co., Mr. Brisbois, of the Sutherland Co., A. G. Weightman, of the Hawthorne Co., and Michael Redmond, of the Kalamazoo Paper Co., went to Appleton, Wis., to attend the Fall Conference of the American Pulp and Paper Mill Superintendents.

It is reported that the Valley Paper Co., the new paper mill which is to be erected at Kalamazoo, Mich., are planning to erect several 2 and 5 story structures on their mill site, to cost in excess of $700,000. George O. Comfort has been elected president of the company.

Kelly Well Co. Takes Over Kalamazoo Plant of Gregg Pump

The Gregg Pump Company's plant at Kalamazoo, Mich., has been purchased by the Kelly Well Company, Inc., of Grand Island, Neb.

According to reports, the Kelly Well Company will organize a $250,000 concern to conduct the work at Kalamazoo and to include work of putting in concrete wells for paper mills in the States of Indiana, Michigan, Ohio, Illinois and Wisconsin.

STEEL

for Immediate Shipment from Stock

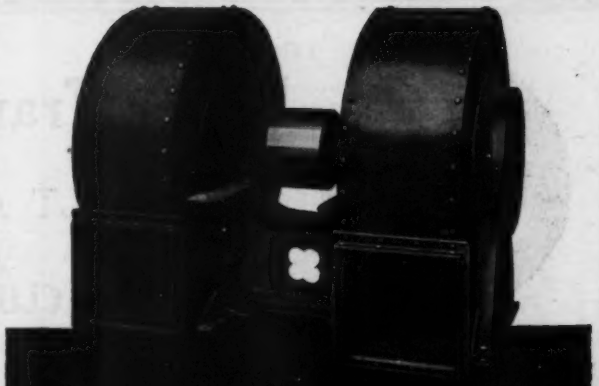
For Maintenance, Construction and Repairs

Bars	Boiler Tubes
Shapes	Boiler Fittings
Structurals	Corrugated Sheets
Rails	Concrete Reinforcing
Plates	Welding Rods
Sheets	Babbitt Metal
Rivets	Tool Steel
Bolts	Bar Iron
Nails	Refined Iron
Wire	Floor Plates
Chain	Safety Treads
Turnbuckles	Small Tools
Shafting	Machine Tools, etc.

Write for the Ryerson Journal and Stock List —the "Key" to Immediate Steel

JOSEPH T. RYERSON & SON INC

CHICAGO ST. LOUIS CINCINNATI DETROIT BUFFALO NEW YORK



Economical Ventilation

Next to efficiency, economical operation and durability are the most important requirements of any mechanical ventilation system.

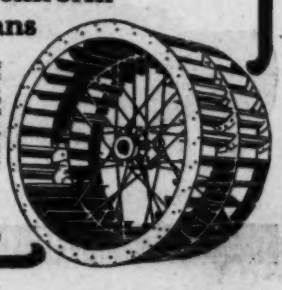
Bayley Plexiform Fans

meet all of these requirements and are in addition designed to occupy a minimum of space. Light, yet sturdy and durable, easy running, moving the greatest volume of air with low power and upkeep costs are a few Bayley Plexiform features. Made in various sizes, either single or double mounts, with outlets in any desired position, for engine motor or lineshaft drive.

Write for Booklet.

BAYLEY MFG. COMPANY

Dept. B Milwaukee, Wisconsin



WANTED

Experienced dyestuff salesman to call on Paper Trade in Middle West. Must know colors and their application. Good opportunity for right man with manufacturers and importers. **Address Box 58, The Paper Industry.**

Steel Plate Construction

Steel Storage Tanks, Blast Furnaces, Gas Holders
Steel River Barges and Plate Work of all Kinds
Steel Transmission Towers

RITER-CONLEY COMPANY

General Offices, Pittsburgh, Pa.

For Sale

One 1-Cylinder Moore & White Tissue Machine, having a trim of 76"; three 40 H. P. Fitchburg Steam Engines; three Noble & Wood 1,000 lb, Beating Engines; one Smith & Winchester 63" Undercut Paper Cutting Machine.

This equipment is all in very good condition, and in the case of the Cylinder Papermaking Machine, same can be seen in operation.

Address Box 59, The Paper Industry.

Pickles' Patent Automatic Steam Regulator

FOR

Paper Making Machines

Which absolutely control the drying of the sheet. Installed on sixty days' trial

W. F. PICKLES **Buckland, Conn.**

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY Boston, Philadelphia, Pittsburgh, Kansas City Chicago, San Francisco, Dallas, London, Eng. **111 Broadway, NEW YORK**

FALLS SOLID FRICTION CLUTCH PULLEY

A complete line of

Power Transmission Machinery

FOR

BELT AND ROPE DRIVES

MANUFACTURED BY

THE FALLS CLUTCH & MACHINERY COMPANY

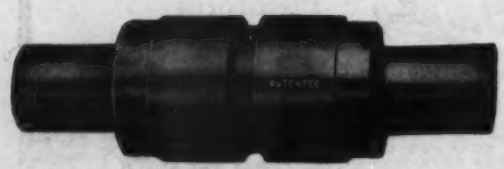
NEW YORK 208-216 Fulton Street

Cuyahoga Falls, Ohio

BOSTON 52 Purchase Street

Catalogues upon request

THE JOHNSON FRICTION CLUTCH



Double Clutch Exterior

Is Also a Clutch for Reverse Drive on PAPER MACHINERY

When used on the countershaft one pulley is mounted on each hub of clutch and thru one open belt and one crossed belt the operation of a machine may be quickly and easily reversed.

Reverse motion may be obtained by installing the clutch between bevel gears on machinery.

Spur gears are often used to get two speeds on machinery.

The Johnson Clutch requires the minimum of space. It is smooth in its pickup and does not grab like a jaw clutch.

Write for Catalog PI.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

The Cost Association of the Michigan Division held their first meeting of the season on Monday, October 29th. General cost problems were discussed at this meeting.

The Allied Paper Mills have just completed extensive repairs at the dam of the Bardeen Division at Otsego.

Claude Buck is now boss machine tender at the Monarch Division of the Allied Mills.

Canadian News

Quebec, Nov. 1, 1923.

The one question of particular interest to the American pulp and paper industries, which is actually in the lime light, is undoubtedly the sittings of the Royal Commission on Pulpwood appointed by the Canadian Federal Government to inquire into the feasibility of placing an embargo upon the exportation of pulpwood.

The Commission has had sittings in the eastern provinces and interesting data has been placed before them. However, regarding the matter of the export of pulpwood—and it was for inquiry into that subject that the Commission was, ostensibly at least, primarily appointed—there has yet been nothing much of value said or recorded. It has been amusing, to say the least, yet characteristic of men who advocate the principle of protecting the national resources of the country to the stand that Canada should, nevertheless, let that raw material go forth just so long as the foreign market is nominally attractive. This kind of evidence will not, it is thought, have much influence in the findings of the Commission.

It is expected that the most interesting sittings of the Commission should be held in the Province of Quebec. In the meantime, controversies are frequent in the press and "letters to the editor" pour in in the most important newspapers, the most prolific epistolarian being Mr. Frank J. D. Barnjum, who is one of the most enthusiastic propagandists of the embargo supporters.

This question of imposing an embargo on the exportation of pulpwood is arousing a good deal of interest in Canada, because it has a considerable influence on the economic conditions of the country, the exports to the United States during the five months ending in August being valued at over $20,000,000, nearly $8,000,000 more than two years ago for the same period.

Mr. Barnjum, the indomitable champion of the embargo, who has placed himself on record as a philanthropist and a good economic scholar, contends that the Canadian forest wealth is depleted every year through fires and unwise lumbering, and that immediate and drastic steps should be taken to preserve this natural asset. He has written strong letters in support of his contentions, which have been published in the most important papers all over the country. He claims that "no one would be permanently injured by an embargo. The moment it is applied, the Americans have frankly told us, a considerable portion of their mills in the United States will be put out of business. This means that these mills will be forced to move in Canada." He closed one of his recent letters by the following threatening words: "If the facts published are not sufficient to convince the most skeptical, there are many more equally convincing and much more alarming still, that are ready for the public if it becomes necessary in order to awaken those who are apparently asleep."

He has not much confidence in the outcome of the Commission, because, he says, the appointment of the Commission was merely a political maneuvre on the part of the Government to evade the issue, and because the Government at Ottawa has already taken the means to render their findings abortive should they, by any chance, recommend the stoppage of the exportation of unmanufactured wood, "the only means," he adds, "at present for effecting any sort of an immediate remedy for a situation which is a little short of a public scandal."

However, if we are to believe the figures published by the Canadian Pulp and Paper Association, two-thirds of the cut of pulpwood were absorbed in 1922 by Canadian mills. There were 104 mills in operation during 1922, and while the value of the production is not as high as in 1920, the quantity of pulp and paper actually produced was much greater, the drops in value being caused by the low prices prevailing.

The capital invested in 1922 was $381,006,324 and the total cut of pulpwood was 3,923,940 cords, valued at $50,735,361. The total value of paper exports was $74,825,893, of which $65,000,332 was exported to the United States.

Walter G. Morey

Morey Paper Mill Supply Co.

Manufacturers' Agents

99 Chauncy St., Boston, Mass.

Specializing in

Canvas Dryer Felts

ALL WEAVES

Clement King

Morey Paper Mill Supply Co. of Canada

19 Alexandre St.

Three Rivers, P. Q.

TRADE MARK REGISTERED U.S. PAT. OFFICE JUNE 21st, 1910

VEELOS

Genuine Balata Belting

The Ideal Belt for Paper Mills
Highest Quality Material
Best and Finest Workmanship
By Most Highly Skilled Craftsmen
Power-Saving Long-Lasting
On Service Basis Cost Is Lowest
Try a VEELOS

THE STANDARD BELT OF THE WORLD

Manheim Manufacturing & Belting Co.

Manheim, Pa.

Claflin Continuous Beaters

NOW IN USE

Demonstrate the fact that they will do BETTER BEATING, BRUSHING and REFINING, produce a STRONGER, SMOOTHER and MORE UNIFORM PULP than is possible with ANY OTHER BEATER. Whether run in tandem or singly in connection with regular Beating Engines, they are GLUTTONS in the amount of work they will do. They are equipped with S K F Ball Bearings and renewable Manganese Cast Steel Fillings.

Write us for details

The Hermann Mfg. Co., Lancaster, Ohio

DESIGNED FOR EFFICIENCY

TABER Pumps fulfill the particular pumping needs for which they are especially built. Forty years' experience in Pump building justifies our well-earned reputation as "PUMP SPECIALISTS."

Submit your pumping problems to us for advice

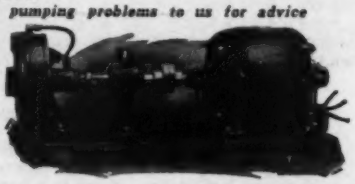
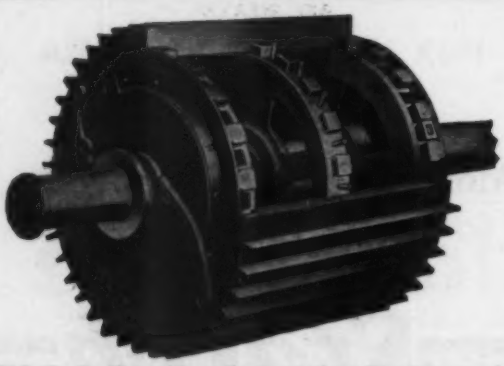


Fig. 604 illustrates Taber L-O 1½x1" motor driven centrifugal pump.

TABER PUMP CO., Buffalo, N. Y.

"Pump Specialists"

Builders of Centrifugal and Rotary Pumps



Dayton Globe Iron Works

DAYTON, O.

We manufacture Beating and Washing Engines, Head Gates, Hoists and Gears.

Our Wedge Type Bandless Roll made of semi-steel with special alloy bars is practically indestructible.

The Howard Pulp Refiner

MAKES your pulp of better quality. The action of the Howard Refiner is to brush out any fibrous material to pulp with a minimum of injury to the fibre.

The quality of pulp produced will be found much better than the pulp as generally reduced. This improved quality means a higher net value per ton.

The Howard Refiner is a time tried machine. It is in use in many paper mills in the United States, Canada and other countries and is giving excellent results

Detailed information will be gladly furnished on request.

Manitowoc Engineering Works

Manitowoc, Wisconsin

"Dayton" Beating Engines are Built for Heavy Duty

Dayton Beater and Hoist Co.

DAYTON, OHIO

Canada to Have New Straw Paper Plant

Plans are being made to construct a paper mill in western Canada, which will be devoted entirely to manufacturing paper from straw. M. Dolfus, managing director of Devains Process, Ltd., of England and France, is now in Canada arranging for the construction of the mill.

This mill will have an initial daily capacity of 50 tons of pulp, which will require 150 tons of straw. It will cost between $1,000,000 and $1,250,000 to put up the first unit of the mill. This includes machinery and plant only.

Rumor has it that the St. Regis Pulp and Paper Company are planning to build a new pulp mill at Cap Rouge, near Quebec, Canada. The company has already obtained a large area of land at a point known as the Cap Rouge pier and wharf, from the Canadian National Railways. The cost of the mill is reported to be over $4,000,000.

New Personals

Ralph Bretzner, for 12 years in the wood pulp department of the Perkins-Goodwin Company, of New York, and more recently secretary and sales manager of J. F. Patton & Company, pulp importers of New York, is now sales manager of the Becker Woodpulp Company of America, Inc., of 501 Fifth avenue, New York City. Mr. Bretzner succeeds Frank E. Dunaway, who recently resigned from the Becker organization.

Charles P. Tolman has recently resigned his position as Chief Engineer and Chairman of the Manufacturing Committee of the National Lead Co., which he has held for the past 16 years. He will now specialize in Dust and Fume Control, Handling Materials and Products, and in Manufacturing Methods and Processes particularly. His new office is in the same building (111 Broadway, New York City) and he will continue as Consulting Engineer for the National Lead Company.

Herbert A. Wilder

The International Paper Company lost an able executive in the death of Herbert A. Wilder, whose mills formed part of the nucleus of that company. He died in Boston on October 12th, at the Phillips House.

Born in 1837, he was probably the oldest New Englander affiliated with the trade. From 1854 to 1897 he was with his brother, the late Charles T. Wilder, as Wilder & Co. This concern, originally paper merchants, were burned out after the great Boston fire in 1872 and hence became manufacturers. They acquired mills at Ashland, N. H., where newsprint and wrapping was made, and later purchased properties at Lyndon and Barnet, Vt. The Ashland mill has since been sold to the Continental Paper & Bag Co., by the International Paper Co., who acquired it along with Wilder & Co.'s mill at Wilder, Vt. This latter property was built by the Wilders in 1883 at a place on the Connecticut river called Olcott Falls, the name of which was later changed to Wilder in honor of Mr. Charles T. Wilder, who in his will provided for various benefits to the town. About the year 1900 these mills were sold to the International Paper Company, and Mr. Wilder has since been a director of the International Paper Company.

Ira S. Reynolds has joined the organization of Mead, Patton & Company, Inc., of 342 Madison avenue, New York City, as sales manager for the Deerfield Valley Paper Company's output of kraft paper. Mr. Reynolds was formerly sales manager of the Claremont Paper Company and the Groveton Paper Company. The Deerfield mill has been in operation since the first of this year with one machine, and is starting up another machine shortly.

The Marquardt-Hewitt Corporation, of 250 Front street, New York City, packers of waste paper for board and paper mills, has absorbed the firm of A. DeAngelis, Inc., of Brooklyn, N. Y., one of the oldest paper stock concerns in the metropolitan district. Both Benjamin and Andrew DeAngelis, formerly of the concern which bears their name and which was established 35 years ago, are now with the Marquardt-Hewitt Corporation.

Josephson & Jacobson, Inc., is the name of a new company organized in New York City and incorporated under New York State laws with a capital of $10,000 to deal in all grades of cotton cuttings for paper mills. Offices and warehouse have been established at 19 Howard street, New York.

Starch

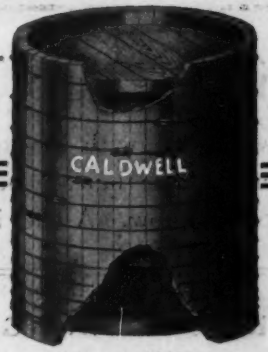
IT takes more than a good argument to make a manufacturer change his process. It requires actual proof. Today the leading manufacturers of high-grade paper and board are using starch for sizing where they formerly used an all-glue size, and they are turning out a better and stronger paper at less cost.

FOX HEAD NIAGARA SPECIAL PAPER

are the recommended brands.

CORN PRODUCTS REFINING COMPANY
17 Battery Place New York

Starch



There is Only One Way

to make paper mill tanks—the Caldwell way. The engineers of the W. E. Caldwell Co. have spent years in discovering it. Caldwell Heavy Yellow Pine Acid Tanks are scientifically constructed according to the strictest engineering principles. Their extreme thickness assures long life; their construction absolutely prevents bulging and breaking. The Caldwell is the only tank for storing acids and for holding stock in solution.

A reputation for the highest grade of products and an experience of over 30 years stands back of Caldwell service.

Send for Catalog

W. E. CALDWELL CO.
Incorporated
2570 Brook Street,
Louisville, Ky.

Caldwell TANKS AND TOWERS

IF WE CAN MAKE RUBBER PRESS ROLLS

[SNAPPY AND TOUGH]

THAT TAKE MORE WATER OUT
THAT ARE EASIER ON THE FELTS
THAT STAND UP BETTER BETWEEN GRINDING

Than what you are using, it would pay to send your rolls to us if we were three thousand miles away. Some mills are doing this.

STOWE & WOODWARD COMPANY

The Rubber Roll Makers

NEWTON UPPER FALLS, MASS.

Fitchburg Duck Mills

ESTABLISHED 1844

FITCHBURG, MASS.

MANUFACTURERS OF

STANDARD AND MULTIPLE PLY

DRYER FELTS

English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.

LOCKPORT Felts

EXCLUSIVE MAKERS OF

Paper Makers' Felts

Have You Run Them?
If Not, Why Not?

Are You Interested in Accurate Running Felts?

Give Us a Trial
Get Authentic Information
Ask the Men Who Run Them

Yours for service

LOCKPORT FELT CO., Newfane, N. Y.

Hamilton Top Felts

run until worn out, with less trouble of "picking" on machine than any other make of top felts can show. A trial is invited

SHULER & BENNINGHOFEN

HAMILTON, OHIO

THE WATERBURY FELT CO.

SKANEATELES FALLS

New York

FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

They Satisfy

Mr. John Stadler, Assistant Manager and Engineer of the Belgo-Canadian Paper Company, Ltd., of Shawinigan Falls, Que., intends to leave this company by the end of this year. His new undertaking will be the building and managing of the new 400-ton paper mill to be erected at Cornerbrook, Newfoundland.

The Detroit Stoker Company announces the appointment of E. L. Beckwith as District Manager in charge of the Company's Chicago office, address Illinois Merchants Bank Building, 230 South Clark St., Chicago. Mr. Beckwith is an engineer with many years experience in Stoker Sales Work.

Frank C. Overton, of Castle & Overton, importers of and dealers in paper mill supplies of 200 Fifth avenue, New York, sailed for Europe several weeks ago, accompanied by Mrs. Overton. Mr. Overton's trip abroad is primarily for pleasure.

Fred S. Hockenheimer, of Hamburg, Germany, foreign representative for Louis H. Abenheimer, importer of paper-making rags, bagging, etc., of 60 Wall street, New York, is now in the United States on a visit.

The Bowater Paper Company, Inc., of New York City, has filed notice of an increase in its capital stock from $150,000 to $200,000.

Orton & Steinbrenner Co., Completes Addition to Plant

The Orton & Steinbrenner Co., 608 S. Dearborn street, Chicago, Ill., manufacturers of locomotive cranes, buckets and coal crushers, have just completed a large addition to their works at Huntington, Ind.

This new addition will approximately double the output of the company. Although it has been only a few years since the original plant was doubled, sales had grown to such an extent that the increased capacity became imperative.

All equipment, including a large number of the most modern machine tools, has been purchased and most of it is already in use.

Handbook on Gears and Speed Transformers

The William Ganschow Company, of 1001 W. Washington Blvd., Chicago, is editing a new Handbook on Gears and Speed Transformers, which will be combined with the forthcoming Ganschow General Catalog No. 100.

The purpose of the Handbook is to afford the user of Gears and Speed Transformers easy access to formulae and data regarding their design and use. It contains much data that is usually found only in general engineering handbooks, and will, undoubtedly, be welcomed by users of this sort of equipment as a ready reference volume.

It is reported that the National Paper Products Co., a subsidiary of the Zellerbach Paper Co., of San Francisco and Los Angeles, Cal., has purchased a 25 acre tract of land in Cudahy, Cal., as a site for a new paper mill, for which plans will be prepared at once. It will consist of a number of buildings, including main mill, power house, machine shop and auxiliary structures, estimated to cost close to $2,000,000, with machinery.

The Consolidated Paper Corp., of Tacoma, Wash., has acquired a local mill, so it is reported. This mill formerly was used for the manufacture of cement, and will be remodeled and improved for the production of waterproof and other paper products. Present machinery will be used where possible and considerable additional equipment will be installed. O. H. Fair is president.

It is reported that the Independent Paper Stock Co., of Fresno, Cal., has awarded a general contract for the erection of a new 1 story plant, estimated to cost $50,000, for which ground will be broken at once.

According to reports, the Flambeau Paper Co., of Park Falls, Wis., has revised plans in preparation for the construction of its proposed new plant unit, consisting of a main 1 story and basement building, with smaller adjoining structures, estimated to cost $175,000, with equipment. Brust & Phillips, 405 Broadway, Milwaukee, are the architects.

For Instance—

One large Canadian paper mill had this fire brick problem:

10 B and W boilers, 500 H. P.; fired with fuel oil.

When this plant was built we recommended ELKCO SPECIAL for this equipment.

They have had such complete satisfaction they have used ELK FIRE BRICK exclusively ever since.

This is only one little instance. Mill reference on request.

WHAT'S YOUR PROBLEM?

ELK FIRE BRICK COMPANY

St. Mary's, Pa. Philadelphia, Pa.
Buffalo, N. Y. Boston, Mass.

In Canada: Elk Fire Brick Co., of Canada, Limited, Hamilton, Ontario, Canada

Service—
That Never Fails

For more than half a century, Brown-Wales has given service that never fails. With each succeeding year this service has improved and speeded up in order to keep a "step ahead" of the demands of industry.

No matter what kind of material you want or how large or how small your order, you can always depend upon Brown-Wales service. You get immediate delivery of exactly the kind of material you want.

An abundance of material always in stock, nearness to railway terminals, every equipment and facility for handling orders and an up-to-the-minute motor fleet to rush orders to any desired point, enable Brown-Wales to maintain the "fastest service in New England."

BROWN-WALES COMPANY

Headquarters in New England for Iron, Steel and Kindred Material. Distributors for Armco Ingot Iron-Resist Rust.

Congress 6100 **BOSTON 9**

Main Street, Bangor, Maine
249 Eddy Street, Providence, R. I.
55 Church St., New Haven, Conn.
261 Broadway, New York City

CENTRIFUGAL PUMPS

for

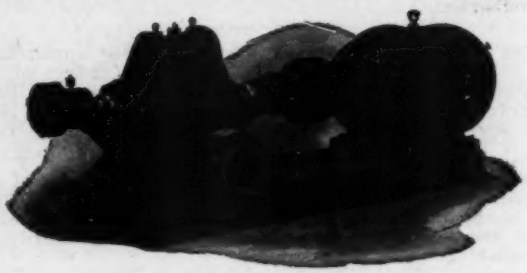
Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.

Aurora Centrifugal Pumps



Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

A card from you stating your conditions places our engineers at your service and results in a saving to you.

AURORA PUMP & MFG. CO.

Home Office and Factories, Aurora, Ill., U. S. A.

A. D. COOK, Inc.

Lawrenceburg Indiana

FIG. NO. 80

Manufacturers of Deep Well Pumps, Working Barrels, Rods, Foot Valves, Strainers and a full line of Water Well Supplies.

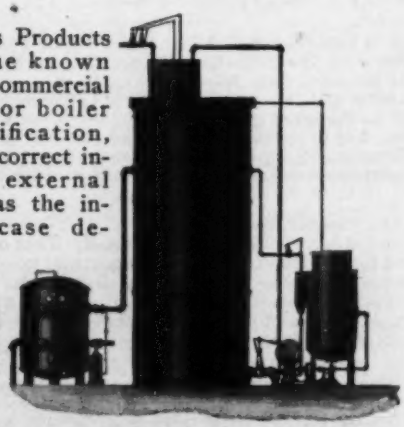
The accompanying half tone shows the COOK Patent Brass Tube Well Strainer with Standard Fittings, which are Bail Plug in the bottom and Foot of Blank and Lead Packer on top.

When the COOK Strainer is properly selected for the water bearing sand, capacity and method of pumping, it will successfully deliver the maximum yield of the well for many years free from sand and the troubles incident thereto.

Write for Bulletin 30A

Water Softening and Filtration

Paige-Jones Products include the known successful commercial methods for boiler water purification, permitting correct internal or external treatment as the individual case demands.



Paige-Jones Pressure Filters insure a clean and clear water for all industrial purposes.

Write today for descriptive literature.

PAIGE & JONES CHEMICAL CO.

417 So. Dearborn St. CHICAGO

248 Fulton St. NEW YORK

National Cost Accountants Adopt Burke Resolution

At the meeting of the National Association of Cost Accountants, Mr. Thos. J. Burke, secretary-treasurer of the Cost Association of the Paper Industry, introduced the following resolution:

"The National Association of Cost Accountants, believing that a great stimulus would be given to the movement now on foot to promote the use of correct cost accounting methods by the members of trade associations generally, and that this movement will be beneficial in placing American industry on a sound economic basis, with resulting large benefits to the consuming public, wishes to go on record to the effect that it believes that the attention of Congress should be drawn to the necessity for some revision of the law as it is now applied to this feature of trade association work."

Mr. Burke has recently received a letter from the Secretary of the National Association of Cost Accountants, stating that this resolution was presented at the last meeting of the Board of Directors held at Buffalo, and it was moved and carried that the President appoint a committee to prepare a memorial addressed to the proper government authority covering the substance of this resolution and to present the matter in greater detail.

Recent Publications

An attractive bulletin, entitled "Type T Heavy Duty Reliance Motors for Direct Current" has been gotten out by the Reliance Electric & Engineering Co. of Cleveland, O. This booklet is composed of 32 pages, 8x10½, and is printed on a fine, buff colored, coated stock. It contains a great many half tone illustrations showing each part of the motor in detail, and views of their motor operating under varied conditions.

New Catalogs on Pulleys and Friction Clutches

Following is a brief description of two new catalogs published by the W. A. Jones Foundry & Machine Company of Chicago, Ill.

Catalog No. 27—Pulleys. Is full of new and valuable information on Cast Iron Pulleys, such as, weights, illustrations, and extra lists for special types, rubber covering list; also describes, illustrates and lists "Lemley" Ball Bearing Loose Pulleys, and Ring Oiling Loose Pulleys. Steel, Wood and Paper Pulleys are also listed.

Catalog No. L-28—Friction Clutches. 56 pages of valuable data on Lemley Friction Clutches, most of which is entirely new. Sleeve Clutches, Cut-off Couplings, Clutch Pulleys, Ball Bearing Clutch Pulleys, Gas Engine Clutch Pulleys, are completely covered with price lists, dimensions, illustrations, horsepower ratings, etc.

Paper on Anti-Friction Bearings

The Reliance Electric & Engineering Co. of Cleveland, O., have available for free distribution, a 52-page paper entitled "Anti-Friction Bearings in the Steel Mill." This paper was compiled by A. M. MacCutcheon, chief engineer for the Reliance Company and was presented before the Association of Iron and Steel Electrical Engineers, and includes the discussion on the subject.

Although this paper is directly applied to the problem of steel mill conditions, it is written from such a standpoint that it is of general interest and value to users and designers of machinery and power equipment in other industries. The paper contains many illustrations and photographs showing the installation of these bearings.

New Steam Specialty Catalogs

Two new catalogs have been recently published by the Wright-Austin Company of Detroit, Mich. The first, Boiler Trimmings, Bulletin No. 500, covers particularly Safety Alarm Water Columns and Trimmings made by the Wright-Austin Company. This booklet covers 24 pages, is 6"x9" in size, printed on good stock and contains many illustrations of these two items.

Separators and Exhaust Heads, Bulletin No. 300, is the title of the second. This is a 56-page booklet, size 3½"x6½" and printed on the same stock as the other. This booklet is also fully illustrated and contains tables of dimensions and price lists of their various types of separators and exhaust heads.

Bulletin No. 5, describing the Glamorgan process of continuous causticizing in soda and sulphate pulp mills, is being distributed by the Glamorgan Pipe and Foundry Company of Lynchburg, Va.

SIMONDS
CIRCULAR SAWS—
Machine Knives for Pulp and Paper Mills
SIMONDS SAW AND STEEL CO.
Fitchburg, Mass. 5 Factories
Chicago, Ill. 12 Branches

DUXBAK
Leather Belting

The Right Belt for Beater Drives

DUXBAK Waterproof belting is not only the right belt for beater drives but is the most economical because of its:

1. Superior power transmitting ability.
2. Large overload capacity.
3. Length of service (proved by past service of 20 to 30 year belts).
4. Salvage value.
5. Cheaper cost per horsepower transmitted per year.
6. Lowest final cost per foot per year.

DUXBAK is extremely pliable and has the gripping power to snugly hug the smallest pulleys running at high speed.

Let our Engineering department help reduce your power transmission cost

Tanners
Belt Manufacturers
Chas. A. Schieren Company
Main Office and Factory
43 Ferry St., New York, N. Y.

HOFFMANN

PRECISION ROLLER BEARINGS

FOR HEAVY LOADS AND HARD SERVICE; STANDARD AND SELF-ALIGNING TYPES

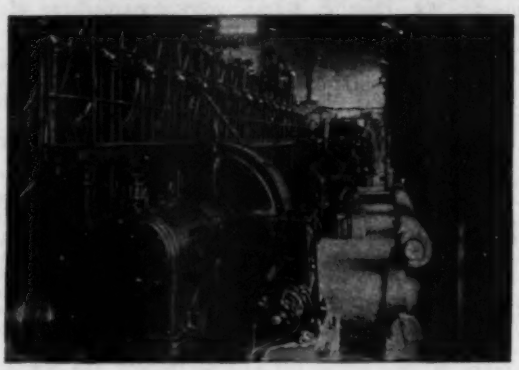
"RTW" TYPE
(Self-aligning)

Equipped with clamping sleeve and nut, and provided with side plates for protection from dirt and moisture. Made to inch dimensions in light and medium series.

Heavy-duty units built to the highest standards of precision; affording maximum serviceability under conditions involving heavy loads, temporary overloads, shocks, jars and vibrations; offering new opportunities for power saving and reduced upkeep costs.

Our engineers will welcome an opportunity to work with yours, in the application of these high-duty, high-precision bearings to paper mill machinery, with a view to securing maximum anti-friction efficiency, minimum maintenance costs, and continuity of service.

THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City New York
MAKERS OF "NORMA" PRECISION BALL BEARINGS



Cleveland Worm Gear Driven Paper Machines

CONSIDER THE CLEVELAND WORM GEAR DRIVE

GROWING appreciation of the Cleveland Worm Gear Reduction Unit by the paper industry is indicated by its use in leading mills in connection with Plate and Rotary Screens, Knotters, Agitators, Pulpers, Fans, Conveyors —(cordwood, coal, lime and ash), Pulp Machines, Boiler Feed Pumps, Thinning Tanks, Wet Machines, Bleach Boilers, Bucket Elevators, Rewinders, Save-alls, Suction Boxes, Presses, Calenders; also in connection with paper machines to take the reduction between prime movers and the lineshaft and the Fourdrinier, Couch, Dryers, Press and Calender sections.

It is becoming well known that the industry's growing preference for Cleveland Worm Drives is based upon high efficiency, compactness, quietness, constant torque and permanently low maintenance cost, plus ability to handle abnormally large gear ratios with ease.

Engineers appreciate the fact that we co-operate with those interested in worm drives to work out the most satisfactory installations from the standpoint of efficiency and permanently low upkeep cost.

Write for complete data.

The Cleveland Worm & Gear Co.
America's Worm Gear Specialists
CLEVELAND, OHIO

Cleveland
WORM GEAR
REDUCTION UNITS

United Clay Mines Corp. Enjoys Unusual Distinction

A letter was recently received from the United Clay Mines Corp., of Trenton, N. J., enclosing a photograph of their officers, taken at their last regular monthly get-together.

It may be interesting to know a few facts about their business, as this industry is so closely associated with the paper industry. The following is taken from their letter:

"So far as we know, this corporation is the only company specializing in high grade clays of every kind and for all purposes, having clay mines in different sections of this country and abroad, where all kinds of high grade clays are produced.

"The business was established over twenty years ago by its present head, Mr. George C. Crossley, and has grown rapidly since its beginning. At the present time it is mining clays which are used for many different purposes, such as the manufacture of china, porcelain, as a filler in paper, also in asbestos products, rubber tires and all rubber goods, in the manufacture of various kinds of cements and paint and many other products."

A New Belt Dressing

"In answer to the growing demand for a belt dressing whose purity of material would be guaranteed, our chemists have prepared an extremely superior grade of belt dressing which is put up in bars and attractively labeled and boxed," states a letter from the Chicago Belting Company of Chicago, Ill.

This dressing is put up in stick form of one pound each. The company claims that the use of this dressing will not only keep the belt pliable and eliminate slipping, but its use will more than double the life of any belt. They go on to state that this has none of the injurious effects of those dressings which have surface adherence only, and whose use so rapidly deteriorates the belt on which it is applied.

The trade name of this article is "Beltex Gripstick."

The Hawley Pulp and Paper Company, of Oregon City, Ore., has started the erection of a million dollar paper mill in addition to their present plant. Preliminary engineering work has already been done and plans for the huge steel and concrete building to cover a ground space 80 by 350 feet, have been prepared.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of The Paper Industry, published monthly at Chicago, Illinois, for October, 1923.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Edward B. Fritz, who, having been duly sworn according to law, deposes and says that he is the owner and publisher of The Paper Industry, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Edward B. Fritz, 356 Monadnock Bldg.; Editor, A. Scott Dowd, 356 Monadnock Bldg.; Managing Editor, A. Scott Dowd, 356 Monadnock Bldg.; Business Manager, Edward B. Fritz, 356 Monadnock Bldg.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Edward B. Fritz, 356 Monadnock Bldg.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ..... (This information is required from daily publications only.)

EDWARD B. FRITZ,
(Signature of publisher, business manager, or owner.)

Sworn to and subscribed before me this 21st day of September, 1923.

(Seal) MARY F. ALLEN.

(My commission expires March 20th, 1926.)

Uniform System of Cost Accounting

A uniform system of cost accounting, for the manufacturers of glazed and fancy paper, has been laid out by a special committee of cost accountants representing members of the Glazed and Fancy Paper Manufacturers Association, and has now been made available to all manufacturers of these grades. The cost system, representing the combined experience of the specialists in this branch of the paper industry is not being forced upon any of the manufacturers, but is offered as a model system, both for those already maintaining cost departments, and for those who have not as yet installed up-to-date cost methods.

It is pointed out in the introduction to the method recommended that the amount of detail involved will differ greatly in meeting the requirements of the different plants, but a uniform method is urged upon the manufacturers in order to enable them to determine definitely the actual cost to figure properly the results of fluctuations in raw materials and changing labor conditions.

The association so thoroughly believes in the principle of uniform cost accounting that it has offered the assistance of its committee to manufacturers wishing to install the system recommended.

It is reported that the pulp mill formerly owned by the Nipigon Pulp and Fibre Co., situated at Nipigon, east of Port Arthur, will probably be purchased by the St. Lawrence Pulp & Paper Co. The mill was built at a cost of more than half a million dollars and had but a short career in pulp production, having commenced operations in May and closed in October of 1921, after which the property was taken over in liquidation.

Crane—Locomotive—New INDUSTRIAL—4 wheel car—gasoline power. Capacities 10,000 pounds at 10-foot radius, 3,000 pounds at 15-foot radius. 27½-foot boom. Handles ¾ yard bucket, coal at 20-foot radius, sand at 17-foot radius. Immediate delivery.
Industrial Works, Bay City, Mich.

"Shear Cut" Slitting and Rewinding Machines

Adj. Rotary Spot Sheet Cutters with Lay-boy cut to register and jog square.

MEISEL PRESS MFG. CO.
948 Dorchester Ave. Boston 25, Mass.

PUMPS
INDUSTRIAL—AGRICULTURAL—MUNICIPAL—RESIDENTIAL
A Type for Every Service
THE GOULDS MANUFACTURING COMPANY
SENECA FALLS, N. Y.
GOULDS

James L. Carey

Paper Mill Architect and Engineer

208 N. Laramie Ave., Chicago, Ill.

J. H. WALLACE & COMPANY
TEMPLE COURT BUILDING
NEW YORK CITY, U.S.A.
CABLES, TRIPLEX, N.Y.

PULP PAPER AND POWER PLANTS

ENGINEERS & CHEMISTS
INDUSTRIAL DESIGN
PLANT IMPROVEMENT
LABORATORY TESTS

Stebbins Engineering & Mfg. Co.

Watertown, New York

Digester, Acid Proof and other Guaranteed Linings

Chemical Pulp Mill Engineers

STURTEVANT DRYING SYSTEMS

You can remove damp steam as it forms; prevent roof drips; dry sheets evenly; reduce felt and press roll crowning bills; and increase production and profit by installing a Sturtevant System.

B. F. STURTEVANT CO., Hyde Park, Boston, Mass.

T35

THE
MANAGEMENT ENGINEERING AND DEVELOPMENT CO.
7TH FLOOR CITY NATIONAL BANK BLDG.,
DAYTON, OHIO.

DESIGN, CONSTRUCTION AND OPERATION
OF
PULP, PAPER AND FIBRE MILLS
WATERPOWER DEVELOPMENT
STEAM POWER PLANTS.

PLANS AND SPECIFICATIONS
EVALUATIONS AND REPORTS
··CONSULTATIONS··

GEORGE F. HARDY

M. AM. SOC. C. E.
M. AM. SOC. M. E.
M. ENG. INST. CAN.

Mill Architect and Consulting Engineer

Langdon Building

309 Broadway, New York

SPECIALTY:

Paper, Pulp and Fibre Mills
Water Power Development
Steam Power Plants
Plans and Specifications
Valuations, Reports
Consultation

Cable Address:
"Hardistock"
A. B. C. 5th Edition
Bedford McNeill
Western Union
Bentley's

H. S. TAYLOR

CONSULTING ENGINEER

Member Am. Soc. C. E.—Am. Soc. M. E.—Eng. Inst., Can.

Pulp, Paper and Fibre Mills
Hydro-Electric and Steam Power Plants
Plans—Specifications—Evaluations—Reports—Consultations

Jefferson St. Arcade, Dayton, O. Guarantee Bldg., Montreal, P. Q.

FERGUSON ENGINEERS

JOHN F. FERGUSON

Complete Pulp & Paper Mills, Investigation of New Enterprises, Special Heat & Power Applications, Hydro-Electric Developments, Steam-Electric Power Systems, Sectionalized Paper Machine Drives.

Analysis, Design, Construction, Operation Efficiency

Holyoke, Mass. 1216 First National Bank Bldg. CHICAGO, ILL.

H. B. Wadsworth

Export *Domestic*

Pulp and Paper
Paper Making Machinery
Mill Supplies, Etc.

51 East 42nd Street
NEW YORK

V. D. SIMONS

Industrial Engineer

PULP AND PAPER MILLS, HYDRO-ELECTRIC AND STEAM POWER PLANTS
ELECTRIFICATION PAPER MILL PROPERTIES

39 S. LA SALLE ST.
CHICAGO

HARDY S. FERGUSON

CONSULTING ENGINEER

200 FIFTH AVENUE NEW YORK CITY

Member Am. Soc. C. E.
Member Am. Soc. M. E.
Member Eng. Inst. Can.

PAPER, PULP AND FIBRE MILLS INCLUDING BUILDINGS AND COMPLETE MECHANICAL EQUIPMENT
WATER POWER DEVELOPMENT
DAMS, STORAGE RESERVOIRS AND OTHER HYDRAULIC STRUCTURES
STEAM PLANTS

Examinations
Reports
Estimates of Cost
Designs
Specifications
Valuations

New York, November 1, 1923.

IN SOME quarters there is a tendency among paper men to complain of the failure of the market to expand to dimensions which were anticipated at about this time, and there is little or no doubt that some kinds of paper are not moving in the volume that manufacturers and dealers would like to witness, yet the market is far from narrow and the industry as a whole is characterized by healthy activity of a scope which is not below that usually noted at this period of the year. It might be said that demand is rather one-sided. Certain kinds of paper, notably news print, building papers and bag paper, are in better than normal demand; mills making these grades are rushed to satisfy the wants of consumers, while other papers are in limited call, buyers being noticeably hesitant and generally confining their orders to tonnage actually and directly required, with mills making such grades anxiously on the lookout for additional business.

Taking the paper industry in its entirety, there is no denying that manufacturing activity is on a better than normal scale. News print mills are working at record capacity and they not only are having no difficulty in finding a ready outlet for their production, but could doubtless market a larger tonnage of paper if they had the facilities for increasing their output. News print consumption thus far this year exceeds all previous records—even the high marks established in the past two years—and it naturally follows that manufacturers of print paper are enjoying excellent business and are being obliged to operate their plants at maximum or close to maximum capacity to turn out all the news print publishers want.

There is also a very active demand for bag papers. This probably is based on the high prices prevailing on cloth sacks, both cotton and burlap, which cause consumers to substitute paper bags whenever they can. Bag paper mills are producing in heavy tonnage and are reported to be behind in deliveries, indicating they have more orders on hand than they can comfortably handle. Reflecting the busy position of this branch of the industry, reports are to the effect that two new paper and paper bag mills are being erected in different parts of the country, one in Louisiana and the other in West Virginia, which will appreciably increase the production of sack papers.

Building papers also continue in very good demand. With the winter coming on there is of course a receding call for such papers, and yet most roofing felt mills keep well engaged and are said to have sufficient orders on file to warrant large production for some time. The outlook for another heavy consuming season in the spring is highly favorable, and it is likely that manufacturers of building paper will pile up a stock during the winter months to cover their anticipated requirements next spring and early summer.

Book paper demand is good, of that there is no doubt, and yet manufacturers are not securing all the business they can accommodate. The same holds true as regards fine papers, wrapping and tissue. Similarly, board mills are on the alert for additional orders, most of them operating at only between 75 and 85 per cent of capacity and being desirous of enough business to justify maximum output.

Many in the trade, in fact, it might be stated a majority of paper manufacturers and merchants, looked for a market during the last three months of 1923 approaching boom proportions. This has actually materialized in several branches of the industry, whereas those who had these fond anticipations for other kinds of paper have been somewhat disappointed. Business is good but not good enough to be satisfactory to all members of the trade. Consumption of many kinds of paper has not risen to the level expected, and obviously buyers have not operated in the market on quite the broad scale that was anticipated. At the same time statistics concerning production, shipments and consumption show that the paper industry should be in a very lively condition. As a matter of fact, it is, but the capacity of paper and board mills of the United States has been increased to such a tremendous extent during the past several years that, even with good business prevailing, every paper producer is not getting all the business that he desires or that he can accommodate.

Board mills are an apt illustration of this situation. There is no question but that consumption of box board at present is head and shoulders above the pre-war consumption; a comparison of figures would probably show that almost half again as much board is being consumed in this country now then prior to the war. Yet board manufacturers in general complain of the slowness of the market for their product, and very few board mills are securing orders enough to absorb more than 75 per cent of their full output. The result is that competition is exceedingly keen, thus leading to a further unsatisfactory market condition.

The prospects for increased business in paper of various kinds are bright. It is not to be denied that a distinct lull has been experienced in many lines of business during the past several months. Statistics of heavy production of some manufactured articles, of record-breaking freight car loadings, of excellent employment conditions and of improvement in export trade to the contrary, it has been apparent that general business activity has slowed down to some extent. Economists have described it as a readjusting of readjustments in the industrial structure. There are, however, numerous signs of a quickening of activity in many lines at the moment. The security markets took a decided brace this week. Federal Reserve Board statistics show an appreciable increase in the nation's wholesale trade. Government reports indicate large agricultural crops, which should certainly lead to improvement in the farmer's condition. Railroad figures show a steady expansion of commodity movements. All of these signs point to better business throughout the country in all lines practically, and it stands to reason that any expansion of activity in almost any direction means larger consumption of paper since paper is used in virtually every industry of the nation.

Newspapers in various parts of the United States are publishing issues of record-breaking size. New York publishers not only are printing a greater number of pages than ever before—a new record for the size of a single regular issue being established almost every week—but they are obliged to omit many columns of advertisements from nearly every issue. This means that publishers could readily consume more news print if they had the necessary supply of paper. The demand for print paper is so voluminous, however, that mills are up against it in filling the wants of customers, and most publishers therefore are limiting their consumption so as to keep within their allotments of news print.

With the end of the year drawing near many in the trade are beginning to speculate on the likelihood of an advance in news print prices in 1924. Thus far none of the large producers of print paper has issued any announcement in this connection, but a good many of the smaller mills are booking contracts at prevailing prices and indications are no change will be made in the quoted basis. A rise nevertheless would not be surprising to the trade, and the opinion is common that an increase of a quarter or a half cent per pound in prices would not affect the consumption nor demand in the least.

Book papers are quotably steady at about an average level of 6.75 cents per pound f. o. b. New York for machine finished book, with coated book quoted from 8 cents a pound upward New York. Fine papers are moving in a steady way though in limited-size quantities chiefly, and quotations show a firm tone. Coarse papers are meeting a fair demand and no change of note has occurred in prices.

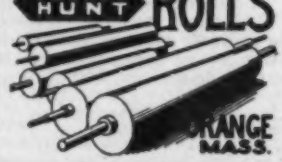
Plain box boards moved off slightly in price in the East during the strike of paper box workers in New York but reverted to previous levels when the strike ended. Mills in the East quote $60 a ton f. o. b. New York for news and chip, and in some cases this price is being shaded.

AMERICAN AND ENGLISH **CHINA CLAYS** OF THE HIGHEST QUALITY

UNITED CLAY MINES CORPORATION

TRENTON, N. J. EAST LIVERPOOL, OHIO

RODNEY HUNT ROLLS



ORANGE MASS.

SERVICE AND SATISFACTION FOR PAPER MILLS

Rodney Hunt Machinery Co.
45 Maple Street, Orange, Mass.

FOR BETTER ROLLS

SLITTERS AND CAMACHINE ROLL-WINDERS

TYPES AND SIZES FOR EVERY ROLL REQUIREMENT OF PAPER AND PAPER GOODS MANUFACTURERS

CAMERON MACHINE COMPANY, PATENTEES & BUILDERS
61 POPLAR STREET, BROOKLYN, NEW YORK

Western Paper Makers Chemical Company

Paper Makers Chemical Company

Kalamazoo, Mich. Holyoke, Mass. Easton, Pa.
Jacksonville, Fla. Pensacola, Fla. St. Austell, England

Rosin Size, Satin White, Clays, Fillers
Foam Killer, Felt Soap and Other Specialties

CASEIN

Standard Quality
Lowest Prices

The Casein Manufacturing Company

15 Park Row New York

ALKALI

QUANTITY AND QUALITY

To assure quantity production and uniform quality the raw materials of paper manufacture must be constant in supply and uniform in quality.

Diamond Tested Alkalies are produced in the most modern alkali plants in the world, where quality is the first consideration. Diamond Soda Ash and Diamond Caustic Soda, because of their uniform high quality, are particularly adapted to the requirements of paper manufacture.

The location of the Diamond plants at Painesville, Ohio, where they are directly served by three trunk line railroads, assures a constant supply of these materials.

Manufactured and Sold by

DIAMOND ALKALI COMPANY

PITTSBURGH, PENNSYLVANIA

Domestic Raw Materials

Papermaking Rags

The market for papermaking rags is moving along in a rather routine fashion, with demand fair and with prices ruling quotably steady on most grades though with the situation showing little or no feature. Mills are purchasing rags in limited volume; of that, there is no doubt, and yet the movement into consuming channels is not subnormal. Some paper manufacturers appear to have fair-sized stocks of rags on hand, and therefore are confining their current purchases to whatever they need to fill in their requirements; others are buying today what they need tomorrow, so to speak, or in a strict hand-to-mouth manner, while others, who apparently are not using rags in normal amounts, are restricting their orders to small tonnage.

At the supply end of the market conditions are somewhat unusual. There is unquestionably a shortage of some descriptions of papermaking rags, principally the better classes of old rags which, it would seem, are not coming forward from collection sources in normal amounts these days. On the other hand, a surplus of other grades doubtless exists. There is no shortage of low quality rags such as are used by roofing paper mills. Importations of these rags from Europe have been moderately heavy during the past several months, certainly they have been large enough to create a plentiful supply in this country, and felt manufacturers are occasioned little or no difficulty in covering their present requirements. In fact, a good many felt paper mills bought in sufficient volume some time ago—particularly for forward shipment from abroad—that they are now enabled to keep out of the market as buyers excepting at intervals. The same condition seems to hold true with respect to most grades of new cuttings, consumers having stocked up to an extent where they can well afford to refrain from other than spasmodic buying.

Ordinarily at this time of the year, with the winter drawing near and with rag consumption by paper mills on a large scale, the trend of prices of rags is upward. As concerns most grades, however, the opposite is true at present. The tendency of prices in this market is unmistakably downward, with some exceptions, of course. Packers and importers seem anxious to effect sales, and their anxiety is leading them to grant concessions in numerous instances. This is apparently caused by the limited demand emanating from papermaking quarters because there is every indication that stocks of rags in the hands of packers, dealers and importers are proportionately smaller than they usually are at this point in the year. There is a lack of disposition shown to speculate in rags and most sellers are desirous of keeping stocks on the move, which accounts in large part for the pressure to market rags that is evident in some quarters.

The feeling prevails among dealers that a spurt of demand will develop for rags in the near future or prior to the close of the year. The mere fact that demand for some weeks has been of such limited proportions prompts those on the selling side of the trade to believe that a good many paper mills are running along with very little reserve stock of rags, and that any increase in activity in the paper trade will start an immediate buying movement. If this materializes, it is contended that prices of rags will rise quickly owing to the small stocks packers and dealers are carrying, but so long as demand continues of the scope of the past few weeks there seems little reason to look for any appreciable change in prices in an upward direction.

The better qualities of old papermaking rags stand out as the firmest items in the market. There is a concrete reason for this. Since raw cotton, and in consequence the by-products of this staple, have been on high price levels, dealers in old white rags, as well as colored stock, have found a ready sale of such materials for wiping purposes. Consumers who ordinarily use cotton waste and other products for wiping are today utilizing old cotton rags to a much larger extent than heretofore, and many of the rags which formerly found their way to paper mills are now being used for wipers. The result is that all the large pieces of rags are picked out as wipers, thus reducing the supply of old whites and blues and similar rags available for paper mills.

There is another factor having important bearing on the rag supply. With cotton selling at 30 cents per pound, large quantities of rags are being consumed by shredding and shoddy mills, whose business obviously has increased tremendously as a result of the high cost of raw cotton. Many rags which otherwise would be held available for paper manufacturers are moving into these channels of consumption, thereby further reducing the stocks on which paper mills might draw.

Dealers generally quote between 7 and 8 cents a pound at shipping points for No. 1 repacked whites, depending on the quality of packing, and higher prices are named in some cases. Street soiled whites have sold at 3 cents f. o. b. dealers' points, and house soiled whites at 3.25 cents a pound. Repacked thirds and blues are bringing 3 to 3.25 cents a pound at shipping points, and rough packing around 2.60 cents.

Roofing rags are quoted at 1.50 to 1.60 cents per pound at shipping points for No. 1 stock and from 1.25 to 1.35 cents for No. 2 packing. Old cotton batting has stiffened in price as a direct result of the high level of raw cotton, and quotations on this material range from 6 to 6.50 cents per pound at dealers' points. Black cotton stockings are firm at 3.25 to 3.50 cents a pound, and lace curtains are selling at 3.75 to 4 cents per pound.

No broad changes have occurred in quotations on new cuttings. The grades in leading demand are white shirt cuttings, fancy shirt cuttings, blue overall, unbleached muslin and canton flannel cuttings, and washables, with about last reported prices ruling.

In foreign rags, dark colored cottons are selling fairly freely at 1.45 to 1.55 cents ex dock New York, and linen rags are in steady call.

Average quotations f. o. b. shipping points and ex dock are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	12.50-13.00
White shirt cuttings, No. 2	6.25- 6.50
Fancy shirt cuttings	6.00- 6.25
Washables, No. 1	5.00- 5.25
Unbleached muslins	11.25-11.50
White lawns	11.00-11.25
Overall cuttings, blue	8.00- 8.25
Black silesias	4.75- 5.00
Light flannelettes	9.75-10.00
Canton flannels, bleached	10.75-11.00
Canton flannels, unbleached	9.75-10.00
Shoe cuttings, bleached	9.50- 9.75
Shoe cuttings, unbleached	8.00- 8.25
Light silesias	7.75- 8.00
O. D. khaki cuttings	4.25- 4.50
Mixed khaki cuttings	3.75- 4.00
Corduroy cuttings	3.75- 4.00
Cottonade cuttings	3.75- 4.00
Linens, No. 1 white, foreign	14.50-15.50
Light prints, foreign	5.25- 5.50
Old Stock—	
Whites, No. 1, repacked	7.00- 8.00
Whites, No. 2, repacked	4.25- 4.75
Whites, house soiled	3.00- 3.25
Whites, street soiled	2.75- 3.00
Lace curtains	3.75- 4.00
Thirds and blues, rough	2.50- 2.70
Thirds and blues, repacked	3.00- 3.25
Black stockings	3.25- 3.50
Cotton canvas, No. 1	4.25- 4.50
White cotton batting	6.00- 6.50
Roofing, No. 1	1.50- 1.65
Roofing, No. 2	1.25- 1.35
Dark colored cottons, foreign	1.45- 1.55
Blue linens, foreign	4.00- 4.50
Gray linens, foreign	6.00- 6.50
White linens, foreign	10.00-10.50
Light prints, foreign	3.00- 3.25

Established 1896

Daniel M. Hicks
Incorporated
Importers and Dealers
Paper-Makers Supplies
200 Fifth Avenue
New York

Foreign and Domestic
Cotton and Linen Rags and Cuttings—Waste Paper — Pulp — Cotton Waste — Bagging — Rope — Strings — Flax, Jute, Hemp and Silk Wastes.

JOSEPH GATTI President and Treasurer

GATTI Paper Stock Corporation
Formerly with the Gatti-McQuade Co.

Paper Manufacturers' Supplies

COTTON AND WOOLEN WASTE

All Grades of Rags and Paper Stock, New Wrapping Paper, Box Board and Cordage

Main Office
220 Fifth Ave., New York

Packing House
13th and Monroe Sts.
Hoboken, N. J.

SANDOZ
Sandoz
ANILINE DYES
for ALL TRADES

We carry
a complete line
at all branches

For samples and prices apply at any of our offices

Sandoz Chemical Works
INCORPORATED
238-240 Water Street, New York
12 South Front Street, Philadelphia
126 Market Street, Paterson
145 Brevard Court, Charlotte, N. C.
36 Purchase Street, Boston

WHITAR
TRADE MARK REG. U.S. PAT. OFF.
News Blue
Auramine

We Supply a Complete Line of Domestic and Imported

Aniline *and* Pigment Colors

for Paper Makers

SPECIAL SHADES OF COLORED PAPER OR SAMPLES OF DYE-STUFF MATCHED AND COM-PLETE FORMULAS FURNISHED

The White Tar Aniline Corporation
56 Vesey Street, New York City
Works: Kearny, New Jersey

"RELIABLE" ROSIN SIZE

All that the name implies

MADE TO MAINTAIN QUALITY
SOLD TO MEET COMPETITION

The Arabol Manufacturing Company
110 East 42nd Street, New York
(Facing Grand Central Terminal)

PLANTS:
BROOKLYN CHICAGO
BRAMPTON ONTARIO

Rope and Bagging

Prices of old manila rope have scored a sharp advance. Reflecting the marked improvement in rope and bag papers, manufacturers of such paper came into the market for old rope several weeks ago and purchased in a volume which sent prices rising at a rapid clip, thus bringing true the predictions of dealers in this commodity that any expansion of demand would result in a strengthening of values. Old manila rope of domestic origin and of No. 1 grade has sold at 6.50 cents a pounf f. o. b. dealers' shipping points in some cases, and it is questionable whether paper mills can secure any domestic rope at all at less than 6.25 cents, if at this price. Foreign rope is bringing very close to the same prices as the domestic article, whenever the quality is right of course, sales at 6 cents a pound and higher having been reported. Strings are in routine demand and are quoted at a cent per pound up to 1.25 cents at shipping points, depending on the quality of packing.

Paper mills are doing little buying of old bagging. There is a routine movement of No. 1 scrap bagging at about 1.15 to 1.25 cents per pound at dealers' shipping points, and occasional sales of limited tonnage of roofing bagging at 85 to 95 cents a hundred pounds are recorded, but the business current is light. Gunny also is in slight demand.

F. o. b. shipping point quotations are:

	New York and Chicago
Gunny, No. 1 domestic	1.25-1.35
Gunny, No. 1 foreign	1.15-1.25
Scrap bagging, No. 1	1.15-1.25
Roofing bagging	.85- .95
Wool tares, heavy	1.50-1.65
Wool tares, light	1.40-1.50
Manila rope, No. 1, foreign	6.00-6.25
Manila rope, No. 1, domestic	6.25-6.50
Sisal strings	2.15-2.35
Mixed strings	1.00-1.25

Old Paper

The trend of prices of old paper is in a downward direction with the possible exception of several grades. Many dealers are inclined to attribute this to the establishment of the Paper Industries Exchange in New York and Chicago, it being contended that operations on the Exchange have so bemuddled sentiment in the waste paper trade that prices have suffered owing to dealers being undecided in which way to proceed in marketing their accumulations of old paper. Indications are, however, that the real reason for the decline has been lack of demand from consuming quarters. The strike of paper box workers in New York, which reduced the consumption of board and caused board manufacturers to curtail their buying of waste paper, started the downward slide of values in the East, and the Western market soon felt the influence of the easiness in the East and responded by recording recessions in prices.

Probably the firmest item in the market at present is folded news. Board mills are absorbing this grade freely because, notably in the East, they are running chiefly on news board instead of chip, and No. 1 folded news is bringing 1.05 to 1.10 cents a pound at shipping points freely, and in some instances slightly higher figures. No. 1 mixed paper is quoted at 70 to 80 cents a hundred pounds, with the higher price prevailing in the West. Old magazines are selling at 1.80 to 2 cents a pound, depending on the packing, for heavy books, and around 1.50 cents for crumpled book stock. Shavings are quoted at an average price of 4 cents a pound for No. 1 hard white, and 3.20 cents for No. 1 soft white shavings. Old kraft paper is steady at 2.25 cents per pound, and white blank news is bringing the same price.

F. o. b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	3.90-4.10
Hard white shavings, No. 2	3.25-3.50
Soft white shavings	3.15-3.25
Colored shavings	1.75-2.00
Heavy book, No. 1	1.80-2.00
Crumpled book, No. 1	1.40-1.60
Ledger stock	2.00-2.15
Kraft, No. 1	2.20-2.30
Manilas, No. 1	1.20-1.40
White blank news	2.20-2.30
Over-issue news, No. 1	1.25-1.30
Folded news	1.05-1.10
Mill wrappers	.90-1.00
Boxboard cuttings	.75- .85
Mixed paper, No. 1	.70- .80
Common paper	.45- .50

Paper Stock
Now Is the Time to Buy Our Raw Materials
Out of the forty different kinds of paper stock graded in our many large warehouses, you are assured a steady, reliable source for procuring raw materials in practically every branch of paper making.
Having specialized for 35 years in this one field you can depend upon a clean, well-packed, uniform product throughout; fulfillment of delivery promises; and because of our output of 300 tons daily, big tonnage at all times.
Write us your wants and we'll gladly send further information.
Mendelson Bros. Paper Stock Co.
910 South Michigan Avenue, Chicago, Ill.
Long Distance Phones: Harrison 240 and 557.

RUSS GELATIN CO.
WORKS—WESTFIELD, MASS.

MANUFACTURERS OF

GELATIN and GLUE
ANIMAL SIZING GLUE STOCK

LARGEST SPECIALISTS IN AMERICA ON
FINE WRITING PAPER SIZING

E. F. RUSS COMPANY 287 Atlantic Avenue BOSTON, U. S. A.

STANDARD BLEACHING POWDER

Manufactured by
Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

MERRIMAC CHEMICAL COMPANY

MANUFACTURERS OF
Paper Makers' Chemicals
Alums and Alumina Compounds

SALT CAKE
SLAB ALUM

We are pleased to receive inquiries for Merrimac Slab Alum. This is manufactured in ingots, weighing about 42 lbs. Many paper companies prefer this form on account of ease of handling and general convenience.

Office
148 State St.,
BOSTON, MASS.

Works
EVERETT, MASS.
WOBURN, MASS.

Reduce Your Costs With Hercules Rosin

Efficient paper manufacturers recognize that rosin of uniform quality helps to maintain a uniform excellence in their product.

Hercules Wood Rosin is produced under rigid chemical control. Consequently, it is free from all impurities and is uniform and the same high standards are maintained in every shipment. For all except the whitest papers it makes good sizing.

We are always glad to answer any inquiries and co-operate with manufacturers.

HERCULES POWDER CO.
Wilmington Delaware
SALES OFFICES:
New York, N. Y. St. Louis, Mo.
Chicago, Ill. Louisville, Ky.
San Francisco, Calif. Buffalo, N. Y.
Chattanooga, Tenn. Duluth, Minn.
Birmingham, Ala.

HERCULES
Naval Stores
Produced Under Chemical Control

Chemical Pulp

From the seller's point of view, a most unsatisfactory market condition exists in chemical wood pulp. Paper and board manufacturers are in anything but a buying mood; some of them at least have appreciable stocks of pulp on hand and therefore are not engaging as buyers to hardly any extent at all, while others are confining their orders almost entirely to pulp which they have urgent need of. Coupled with this situation on the consuming side, there has been and still is some pressure to sell. Producers and dealers in certain cases are anxious to turn stocks into money and consequently are granting concessions to secure orders. Moreover, a good many producers are leaving nothing undone in their efforts to keep their plants operating at as near capacity as possible, and an easy price tone has accordingly been created at manufacturing sources. Furthermore, domestic pulp mills are obliged in frequent cases to quote low prices so as to compete with the foreign pulps coming into the country, and all in all everything seems to tend toward a weak market condition.

It is a difficult matter to state what actual pulp values are under prevailing circumstances. For example, the leading domestic producers of bleached sulphite are reported quoting from 4 to 4.50 cents a pound at pulp mills for their No. 1 product, yet it is said they are accepting orders at rates a good deal below these prices. No. 1 unbleached sulphite is quoted at 3 cents at producing plants, and easy bleaching sulphite at 3.25 to 3.50 cents per pound. Kraft pulp is available at 3.10 to 3.25 cents at producing mills, and at cheaper figures in some cases. Buyers have matters much their own way and any bids within reason are generally accepted.

F. o. b. pulp mill quotations are as follows:

Bleached sulphite	4.00-4.50
Easy bleaching sulphite	3.25-3.50
Unbleached sulphite, No. 1	3.00-3.25
News grade sulphite	3.00-3.15
Soda pulp, bleached	3.75-4.00
Mitscherlich, unbleached	3.35-3.50
Kraft, No. 1	3.00-3.25
Screenings, refined	1.75-2.00

Mechanical Pulp

Water conditions in pulp grinding districts have improved to a pronounced degree during the past couple of weeks, heavy rains having provided much more water in mill streams and thus permitting manufacturers to increase their production of ground wood, yet from all observations there is still somewhat of a shortage of mechanical pulp and the tone of prices rules distinctly firm. Indications are that grinders are so well sold ahead that they have very little of their current output to dispose of to other than regular customers, particularly since their stocks have been reduced to a low level during the summer drouth, and consumers depending on open market purchases to cover their requirements are doubtless experiencing difficulty in locating all the ground wood needed. Moreover, consumption of mechanical pulp is on a large scale, news print manufacturers using pulp in record volume and other paper and board mills utilizing possibly a little better than normal amounts.

Reports say that grinders in Canada are still securing up to $50 per ton f. o. b. pulp mills for ground wood for prompt shipment, which is probably true since a good many domestic consumers are looking to the Dominion to obtain the bulk of their present supplies. Domestic quotations range from $40 a ton upwards at grinding plants, some sales where a low freight is involved having been reported at $44 and $45 per ton. Fair amounts of Scandinavian ground wood are being offered at prices around $44 a ton ex dock at New York or other American Atlantic ports.

Chemicals

With larger supplies coming in from the Argentine, prices of casein show a sagging tendency, and sales down to 14 cents per pound ex dock or at shipping points have been reported. Bleaching powder is quotably steady at 1.50 to 1.60 cents a pound f. o. b. works, and is enjoying a fair demand. Caustic soda is quoted at 3.20 cents a pound for spot delivery f. o. b. works, and soda ash is selling at around 1.50 cents per pound. The movement of most papermaking chemicals is routine in character but nevertheless is of fair magnitude.

Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	4.00- 4.25
Bleaching powder	1.50- 1.60

MICHIGAN ALKALI COMPANY
Wyandotte, Michigan

SODA ASH

CAUSTIC SODA

Sole Selling Agents
EDWARD HILL'S SON & COMPANY
21 East 40th Street, New York

"Distinguished for their High Test and Uniform Quality"

K V P

Serve the Nations of the Earth today--

K. V. P. Genuine Vegetable Parchment
Pure Waxed Papers
Household Specialty Rolls
Bond and Ledger Papers

Kalamazoo Vegetable Parchment Co.
Kalamazoo, Mich.

EASTERN MANUFACTURING COMPANY

BLEACHED SULPHITE

Made from spruce grown in the forests of Northern Maine.

Send for Samples.

EASTERN MANUFACTURING CO.
501 Fifth Avenue NEW YORK

BITUMASTIC

A Coat of Bitumastic Will Rejuvenate Your Plant

THE fine glossy finish of Bitumastic Solution makes a wonderful improvement in the appearance of plant and equipment—to say nothing of its protection against rust and its exceptional durability. Just the thing for stacks, boiler fronts, pipes, tanks, structural steel, metal roofs and buildings and other steel surfaces.

Use Bitumastic now to protect your steel work against the rigors of winter weather.

WAILES DOVE-HERMISTON CORPORATION

17 Battery Place, New York

322 S. Delaware Ave., Philadelphia

Rockefeller Building, Cleveland

New Papers

Writing—	
White rag	20-45
White sulphite	11-30
Colored rag	16-40
Ledger—	
White rag	20-50
White sulphite	13-30
Colored sulphite	14-30
Colored rag	16-50
Bonds—	
White rag	19-45
White sulphite	9-30
Colored sulphite	10-30
Colored rag	18-45
Book—	
No. 1 S. & S. C.	6.75- 7.50
Machine finished	6.50- 7.25
English finished	6.75- 7.50
Coated and enameled	8.00-12.00
Lithographed, M. F.	9.00-14.00
Newsprint—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.25- 4.50
Side runs	3.25- 3.75
Cover Stock—	
Coated, both sides	10.25
Coated, one side	10.15
Tissue—	
No. 1 white, 20x30	.80- .90
No. 2 white, 24-36	.70- .80
No. 1 manila, 24-36	.70- .80
Kraft	1.00- 1.25
Wrappings—	
No. 1 Kraft	6.50- 7.25
No. 2 Kraft	6.00- 6.50
Boards—	New York and Chicago
Solid news	65.00-70.00
Straw	55.00-60.00
Plain chip	55.00-60.00
White coated chip	80.00-85.00
Manila coated chip	70.00-75.00
Binder's board	85.00-90.00

Chemicals (Continued)

Brimstone (long ton, at mine)	18.00-20.00
Casein (duty paid)	14.00-16.00
Caustic soda, spot delivery	3.20- 3.30
China clay, domestic washed	12.00-15.00
China clay, foreign	15.00-20.00
Rosin, grade E	5.95- 6.00
Satin white	1.75- 2.00
Soda ash, 58 per cent light (bags)	1.45- 1.60
Starch, papermakers', in bags	3.45- 3.65
Talc (ton)	14.00-16.00

Paper Makers See Business Conditions as Sound

"The paper industry has little to fear from the future, for the basic conditions of the country are sound," says the October market review of the Paper and Pulp Industry, the monthly bulletin of the American Paper and Pulp Association. "In the paper industry itself there is a general sentiment of conservative optimism.

"In the fine paper field, the costs are as high as they have been, stocks at the mills are normal, while those in the hands of merchants and printers are below normal. The market is very firm for higher grades of paper, and the demand is fast returning. In this field, the manufacturers anticipate very good business all this fall, and well into if not all through the year.

"Book paper production for August showed a 20 per cent increase over July, and shipments were 18 per cent above those of July. Canadian coated paper quotations have gone up a half cent, based somewhat on the high prices for casein, but the casein situation at present is much more favorable than in the early part of the year. Coated paper consumption suffered somewhat from enforced changes to super-paper by big consumers, owing to the increased cost of making casein coated papers. With Argentine casein again in the market, even though at high prices owing to the unwarranted duty, the situation is somewhat less difficult than earlier in the year.

"The wrapping paper situation will certainly be quick to show a response to an improvement in business, as in many ways the wrapping paper field is more responsive than other grades to changes in business. When the housewife is a free buyer of food stuffs, the wrapping paper demand immediately mirrors this improved situation.

"The improvement in the paper board group is also indicative of an improvement in public commodity buying, and the wrapping and bag groups should not be far behind the 25 per cent increase in board production recorded for August as compared with July.

"Specialties, such as waxed, vegetable parchment, and other food protective papers, as well as the glazed and fancy papers used by the box manufacturers are already showing improvement.

"The New York newspaper pressmen's strike will not be a long time factor in the newsprint situation. Some of those close to the situation expect an increase of 10 per cent in newsprint consumption the coming year, over 1923."

Wisconsin Forest Protective Association Organized

The permanent organization of the Wisconsin Forest Protective Association is the result of the meeting held at Appleton, Wis., October 23, which was arranged by the American Paper and Pulp Association in co-operation with the Wisconsin paper and pulp manufacturers, for the primary purpose for consideration of forest protection in the state, with particular attention to fire control and fire prevention.

The officers elected for this organization were: President, D. C. Everest, Marathon Paper Mills Co., Wausau, Wis.; vice-president, J. L. Delbridge, Falls Manufacturing Co., Oconto Falls, Wis.; secretary-treasurer, B. T. McBain, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

A most significant feature of the new organization's program is that it has the entire approval of the leading state officials interested in taxation and forest fire prevention. The conference was attended by State Tax Commissioner Lyons, State Conservation Commissioner Hall and State Forester Harrington. Fourteen Wisconsin paper and pulp mills were represented at the conference.

According to a report from the American Paper and Pulp Association, some features of the organizations of fire prevention associations in the Pacific Northwest may be adopted. Secretary McBain is securing from these various associations copies of their articles of organization, because of their long success in organizing districts for the war against forest fires.

Another feature of the Wisconsin program may be the extension of the Badger state movement to other states where there is still pulpwood timber. Wisconsin, noted for its progressiveness, therefore, may take the lead in a new campaign of the paper industry for the formulation of state forest programs by co-operation between the pulpwood consumers and the state authorities. The paper industry has been a leader nationally in the campaign for adequate state and national forest legislation, but the formation of the Wisconsin Forest Protective Association is an approach to this problem from an entirely new angle.

The following directors have been selected for the new association: Guy Waldo, Flambeau Paper Co., Park Falls, Wis.; O. Bache-Wiig, Wausau Sulphate Fibre Co., Mosinee, Wis.; F. E. Sensenbrenner, Kimberly-Clark Co., Neenah, Wis., and C. L. Cecil, Cornell Wood Products Co., Cornell, Wis. These four, together with President Everest, Vice-President Delbridge and Secretary McBain will form the executive committee of the new organization.

J. ANDERSEN & CO.
21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden

The Pulp and Paper Trading Co.
21 East 40th Street New York City

DEALERS IN DOMESTIC CHEMICAL AND MECHANICAL PULPS AND PAPER

AGENTS FOR
J. & J. Rogers Company, Ausable Forks, N. Y.
E. B. Eddy Company, Ltd., Hull, Canada

Canadian Kraft Limited, Three Rivers, Canada
Dealers in Wayagamack Kraft Pulp

Howard Smith Paper Mills, Montreal, Quebec
EASTERN AGENTS of Sulphite Pulp. Made by
Port Huron Sulphite & Paper Co., Port Huron, Mich.

The B QUALITY PULPS

HAFSLUND NORWAY — **"HAFSLUND BEAR"** Bleached Sulphite

F: HAGA — **"FORSHAGA"** Bleached Sulphite

KRAFT HURUM NORWAY SPECIAL — **"HURUM SPECIAL"** Extra Strong Kraft

KOOS BAC — **"BAMBLE"** Extra Strong Kraft

The Borregaard Company
200 Fifth Ave. Incorporated New York, N.Y.

Agents
A/S TOTEN CELLULOSEFABRIK
Bleached Sulphite

A/S GULSKOGEN
CELLULOSEFABRIK
Easy Bleaching
Sulphite

PERKINS-GOODWIN CO.
NEW YORK
PULP and PAPER

Agents
SUND AKTIEBOLAG
Strong Unbleached Sulphite
(Indirect Cooking)

EXPORTS

Exports of paper from the United States during the month of August, 1923, again showed an upward tendency, according to figures compiled by the Department of Commerce. Paper exports reached a total value of $2,172,840 in August, compared with $2,079,267 during July this year and $2,076,985 during August, 1922. Exports of news print were slightly greater in August, but they were still approximately 50 per cent under the August, 1922, figures. Exports of book paper, on the other hand, which had shown a general upward trend since the beginning of the year, fell off in August, although owing to better prices the value of the August shipments was somewhat larger than for the same month last year.

The value of wrapping paper exports during August was greater than during July, 1923, or August, 1922, though there was an actual reduction in the volume shipped.

Other items of the paper schedule, exports of which improved in August last, compared with July, are: Writing paper, valued at $89,530; surface-coated paper, $63,763; toilet paper, $63,316; wall board, $54,567, and paper bags, $66,772. Exports of writing paper and paper bags, however, were less during August than in the same month a year ago, while shipments of wall board were valued at about $4,000 less than in July, although the tonnage exported was somewhat greater.

Shipments of photographic paper, valued at $105,192; tissue and crepe paper, valued at $75,275, and of boxes and cartons, valued at $85,728, declined, compared with July exports, although all three showed an increase in volume and the last two in value compared with August, 1922.

Exports of the chief paper items from the United States during August, 1923, with comparative figures for the preceding month and August, 1922, are shown in the following table:

Items	August, 1922 Pounds	August, 1922 Value	July, 1923 Pounds	July, 1923 Value	August, 1923 Pounds	August, 1923 Value
News print	3,878,867	$181,077	1,959,981	$102,561	1,998,946	$109,275
Book paper, not coated	2,693,187	246,203	3,010,650	326,817	2,248,910	252,826
Wrapping paper, including kraft	2,060,354	146,747	2,100,518	165,137	2,020,526	177,762
Paper board and strawboard	5,800,336	314,096	4,991,223	227,066	6,416,992	284,349
All other	.....	1,258,862	.....	1,157,643	.....	1,348,628
Total	.....	2,076,985	.....	2,079,267	.....	2,172,840

IMPORTS

Wood Pulp

The market for imported wood pulp is in a rather chaotic state. Demand from paper and board mills is noticeably limited, and not withstanding that the markets in Europe are ruling comparatively steady and producers there are quoting prices very nearly on the levels last reported, prices in the United States are on the down slide. As a matter of fact, no one knows what the definite market value of most grades of pulp is. There is no established level and prices fluctuate from day to day—almost invariably downward—in such a manner that buyers and sellers alike are at a loss to keep tabs on prevailing values.

The easy price condition would seem to be the result of the very slow demand that has existed for foreign pulp for some time. Consumers in this country have of course engaged in some buying, but not in a volume large enough to sustain the market, especially since there have been those on the selling side who have been anxious to convert pulp into money and who have granted concessions in prices.

Pulp imports continue on a rather high level. During August imports of chemical wood pulp into the United States totaled 89,603 net tons, compared with 73,567 tons imported in the preceding month, and 74,609 net tons in August, 1922. August importations brought the total for the first eight months of this year up to 685,516 net tons, showing a monthly average of 85,689 tons, compared with a monthly average for the corresponding time a year ago of 71,073 tons.

Importations of ground wood into the United States in August amounted to 22,460 net tons, making a total for the first eight months of 1923 of 173,120 net tons, or a monthly average of 21,640 tons, contrasted with average monthly imports in the same period of 1922 of 14,072 tons.

The feeling still exists among pulp traders that a spurt in demand and prices is likely to be witnessed within the very near future. Some paper and board manufacturers are doubtless well fixed with stocks of pulp or supplies on order for the remainder of the year, but there are others who, from all indications, have not begun to cover their requirements over the winter, and it is expected that these consumers will come actively in view as buyers before the Baltic freezes and navigation from Sweden stops. Importers contend that if this anticipated demand develops there is small doubt that prices will strengthen, since producers in Scandinavia haven't anywhere near their normal amounts of pulp to dispose of during the balance of this year, and since prices at primary sources are holding up fairly well.

Kraft pulp of No. 1 grade is quoted at about 3 cents a pound ex dock, New York or other American Atlantic ports; however, this price is being shaded, and in exceptional cases buyers have succeeded in getting kraft pulp down to as low as 2.75 cents. Bleached sulphite is quoted at around 4 cents per pound on the dock, and consumers show aversion to paying beyond this figure even for the best grades of foreign bleached. Unbleached of strong quality is selling at from 3 cents a pound upwards, with quotations ranging to 3.30 cents, ex dock. Foreign ground wood is quoted at $46 to $48 per ton on the dock at Atlantic ports.

Receipts at the port of New York in October and current market quotations, ex dock, New York, follow:

Bleached sulphite, No. 1	$ 4.00- 4.50
Unbleached sulphite, No. 1	3.00- 3.30
Easy bleaching	3.25- 3.50
Mitscherlich unbleached	3.25- 3.50
Kraft	2.75- 3.00
Ground wood, per ton	46.00-48.00

Poland Paper Co., 2,652 bls. from Venice; M. Gottesman & Co., 2,701 bls. from Hamburg and 4,200 bls. from Rotterdam; Castle & Overton, 1,600 bls. from Bremen and 2,201 bls. from Rotterdam; E. M. Sergeant & Co., 1,270 bls. from Gothenburg and 1,250 bls. from Greaker; National City Bank, 1,400 bls. from Gothenburg and 250 bls. from Greaker; Mechanics & Metals National Bank, 1,570 bls. from Gothenburg and 1,250 bls. from Greaker; Pagel, Horton & Co., 3,428 bls. from Gefle, 1,200 bls. from Bremen and 3,350 bls. from Gothenburg; Bulkley, Dunton & Co., 1,275 bls. from Gefle and 4,025 bls. from Bremen; H. Hollesen, 1,435 bls. from Bremen; Perkins-Goodwin Co., 300 bls. from Christiania; Kidder, Peabody Acceptance Corp., 7,560 bls. from Greaker and 2,250 bls. from Christiania; Robert Dollar Co., 11,730 bls. from Port Alice; J. Andersen & Co., 1,200 bls. from Christiania; E. Naumberg & Co., 1,885 bls. from Hamburg and 501 bls. from Bremen; Scandinavian Pulp Agency, 508 bls. from Gothenburg; Johaneson, Wales & Sparre, 500 bls. from Gothenburg; Tidewater Paper Mills Co., 9,900 bls. from Botwood, N. F.; American Woodpulp Corp., 448 bls. from Bremen; Lagerloef Trading Co., 3,066 bls. from Bremen; North German Lloyd, 75 bls. from Bremen; Nilsen, Lyon & Co., 600 bls. from Gothenburg; Guaranty Trust Co., 800 bls. from Hamburg; Ladenburg, Thalman & Co., 100 bls. from Hamburg; Order, 625 bls. from Gothenburg, 1,000 bls. from Hamburg and 1,000 bls. from Antwerp.

Paper Stock

Imports of papermaking rags continued to increase during October, there being probably a larger tonnage of rag stock brought into the country last month than in September, and October importations perhaps constituting the biggest month's imports thus far this year, judging from figures of arrivals through the port of New York. Some fair-sized shipments of old rope also were received, and occasional lots of waste paper were imported. Arrivals at the port of New York in October and consignees follow:

Old Rope

Brown Bros. & Co., 85 coils and 183 bls. from Antwerp, 501 coils and 177 bls. from Rotterdam, 611 coils from Bristol, 113 coils and 17 bls. from Hamburg, 158 coils and 16 bls. from Hull, 40 coils from Bremen, 303 bls. from Havre, and

BATHURST LUMBER COMPANY, LIMITED

PRICE & PIERCE, LTD.
17 East 42nd Street, NEW YORK CITY

ARE NOW THE

SOLE SELLING AGENTS
for Bathurst Pulp

Unbleached Sulphite 50 tons daily
Kraft Pulp 50 tons daily

Our pulp is made from Canadian Spruce
We ship in sheets, baled

BATHURST, NEW BRUNSWICK, CANADA

SOLVAY
STANDARD IN
SODA
SINCE 1881

SOLVAY products are sold on the basis of actual Alkali content

SOLVAY 58% Soda Ash contains 58% of actual sodium oxide

SOLVAY 76% caustic soda contains 76% of actual sodium oxide

Specify SOLVAY—the standard in SODA since 1881

The Solvay Process Co.
Detroit, Mich.; SYRACUSE, N. Y.; Hutchinson, Kas.

Sales Agent
WING & EVANS, Inc.
40 Rector Street, New York
Boston Cincinnati Cleveland Detroit Pittsburgh
Chicago Syracuse Indianapolis

SOUTHWARK
HYDRAULIC EQUIPMENT
for PULP and PAPER MILLS

The Southwark Pulp Presses and Trucks illustrated at the right are typical of many efficient installations of Southwark Equipment in actual service in paper mills throughout the United States and Canada. In addition to standard dehydrating presses for pulp, sulphite, etc., we specialize in the design and construction of machinery to suit the manufacturers' requirements.

We carry a complete line of Hydraulic Accumulators, Pumps, Valves, Fittings, Shock Absorbers, etc.

SOUTHWARK
FOUNDRY & MACHINE CO.
PHILADELPHIA, PA.

CHICAGO
FISHER BUILDING

CLEVELAND
SWETLAND BUILDING

Three 600 Ton Southwark Pulp Presses and Trucks at the Timiskaming Pulp and Paper Company, Haileybury, Ontario, Canada.

173 coils and 34 bls. from London; International Purchasing Co., 68 bls. from Havre; W. Schall & Co., 131 bls. from Barcelona; L. H. Abenheimer, 72 bls. from Rotterdam; M. Wolfer & Co., 6 bls. from Havana; Maurice O'Meara Co., 140 coils from Antwerp; Ellerman-Wilson Steamship Line, 207 coils from Southampton, 93 coils and 20 bls. from Hull and 188 coils from London; International Acceptance Bank, 16 bls. and 206 coils from Copenhagen and 250 bls. from Genoa; Salomon Bros. & Co., 72 bls. from Rotterdam; National Bank of Philadelphia, 63 coils from Glasgow; E. J. Keller Co., 233 bls. from Havre and 80 coils from Rotterdam; N. E. Berzen, 15 bls. from Havana; Order, 62 coils from Rotterdam, 46 coils from London and 6 bls. from Liverpool.

Old Bagging

Irving Bank-Columbia Trust Co., 125 bls. from Antwerp; Maurice O'Meara Co., 46 bls. from Antwerp and 101 bls. from Rotterdam; Katzenstein & Keene, 157 bls. from Genoa; E. J. Keller Co., 149 bls. from Antwerp and 127 bls. from Rotterdam; E. Butterworth & Co., 120 bls. from Antwerp; Daniel M. Hicks, Inc., 51 bls. from Antwerp; Mechanics & Metals National Bank, 68 bls. from Antwerp; Order, 52 bls. from Manchester.

Rags

Katzenstein & Keene, 347 bls. from Dunkirk, 58 bls. from St. Nazaire, 108 bls. from Bordeaux and 4 bls. from London; Alexander Brown & Sons, 250 bls. from Dunkirk; Stone Bros. & Victor Galaup Co., 236 bls. from Havre and 127 bls. from Dunkirk; Maurice O'Meara Co., 130 bls. from Barcelona, 333 bls. from Antwerp, 128 bls. from Dunkirk and 135 bls. from Hamburg; E. J. Keller Co., 274 bls. from Algiers, 402 bls. from Antwerp, 552 bls. from St. Nazaire, 448 bls. from Bordeaux, 92 bls. from Havre, 47 bls. from Hamburg and 228 bls. from Copenhagen; L. H. Abenheimer, 739 bls. from Barcelona and 291 bls. from Hamburg; M. Wolfer & Co., 42 bls. from Havana; American Woodpulp Corp., 520 bls. from Rotterdam and 12 bls. from Havre; Wilkinson Bros. & Co., 19 bls. from Rotterdam; Castle and Overton, 275 bls. from St. Nazaire, 700 bls. from Bordeaux, 11 bls. from Havre, 45 bls. from Dunkirk and 42 bls. from Hamburg; Waste Material Trading Corp., 45 bls. from Bordeaux, 83 bls. from Havre and 38 bls. from Rotterdam; Daniel M. Hicks, Inc., 35 bls. from Havre and 5 bls. from Antwerp; Albion Trading Co., 70 bls. from Liverpool; A. C. Fetterolf, 114 bls. from Liverpool; S. Silberman Co., 200 bls. from Bremen; Schulz & Ruckgaber, 14 bls. from Liverpool; Salomon Bros. & Co., 29 bls. from Dunkirk; E. W. Dutton, Inc., 72 bls. from Rotterdam; S. Birkenstein & Sons, 234 bls. from Rotterdam; Paul Berlowitz, 228 bls. from Rotterdam and 329 bls. from Havre; A. Brown & Sons, 400 bls. from Bordeaux; Goldman, Sachs & Co., 270 bls. from Bremen, 445 bls. from Copenhagen, 205 bls. from St. Nazaire, and 116 bls. from Bordeaux; Meadows, Wye & Co., 31 bls. from Liverpool; Brown Bros. & Co., 363 bls. from Antwerp and 20 bls. from Havre; Equitable Trust Co., 3,650 bls. from Havre, 216 bls. from St. Nazaire and 83 bls. from Marseilles; First Federal Foreign Banking Ass'n., 67 bls. from Alexander Brown & Sons, 250 bls. from Dunkrk; Stone Antwerp; Chemical National Bank, 280 bls. from Rotterdam; Manufacturers Trust Co., 113 bls. from Dunkirk, 32 bls. from London and 401 bls. from Hamburg; International Acceptance Bank, 479 bls. from Dunkirk, 183 bls. from Bremen and 564 bls. from Bristol; Cleveland Trust Co., 1,242 bls. from Marseilles; Guaranty Trust Co., 246 bls. from Rotterdam, 52 bls. from Liverpool, 95 bls. from Manchester, 1,336 bls. from Bristol, 314 bls. from Hamburg, 104 bls. from London and 147 bls. from Venice; Mechanics & Metals National Bank, 395 bls. from Antwerp; Marquardt-Hewitt Corp., 18 bls. from Rotterdam; Fenton Co., 1,385 bls. from Hamburg; New York Trust Co., 44 bls. from Bremen, 140 bls. from Bordeaux, 146 bls. from Leghorn and 356 bls. from Antwerp; Irving Bank-Columbia Trust Co., 37 bls. from London; International Acceptance Bank, 251 bls. from London; American Express Co., 257 bls. from Bristol and 91 bls. from Glasgow; Shupp & Co., 145 bls. from Hamburg; Order, 186 bls. from Leghorn, 71 bls. from Liverpool, 119 bls. from Manchester, 568 bls. from Antwerp and 11 bls. from Havre.

Miscellaneous Paper Stock

Crane & Co., 104 bls. from Dundee; Maurice O'Meara Co., 20 bls. from Dundee and 113 bls. from Buenos Aires; Irving Bank-Columbia Trust Co., 817 bls. from Antwerp; Equitable Trust Co., 701 bls. from Antwerp and 104 bls. from Glasgow; John F. Boyle & Co., 354 bls. from Dublin and 206 bls.

HANS LAGERLOEF, President and Treasurer
ORVAR HYLIN, Vice President
MAURICE LONDON, Secretary

TRADE HL MARK
REGISTERED

Lagerloef Trading Co., Inc.

52 Vanderbilt Avenue
NEW YORK, N. Y.

Telephones
Murray Hill { 4246 / 4247

WOOD PULP

SOLE AGENTS IN U. S. A., CANADA, MEXICO AND CUBA FOR

Finnish Cellulose Association
Helsingfors, Finland

AND

Finnish Wood Pulp Union
Helsingfors, Finland

E. J. KELLER COMPANY
INCORPORATED
200 FIFTH AVENUE
NEW YORK

FOREIGN AND DOMESTIC
PAPER MAKERS' SUPPLIES
CHEMICAL AND MECHANICAL PULPS
COTTON, JUTE AND FLAX WASTES
EAST INDIA MERCHANDISE

Quality Guaranteed

The Smallwood-Low Stone Co.
Lisbon, Ohio
U. S. A.

TAYLOR'S SPIRAL RIVETED PRESSURE PIPE

For many years the preferred piping in Paper and Pulp Mills

LIGHT STRONG DURABLE

Sheet Steel Fittings Made to Individual Requirements

AMERICAN SPIRAL PIPE WORKS
P. O. BOX 485 CHICAGO

Swenson Reclaiming Machinery

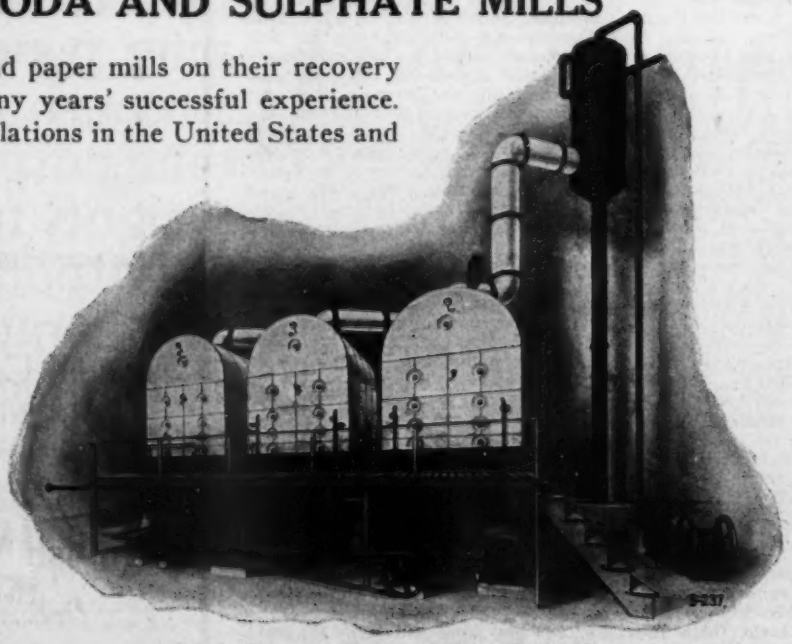
FOR SODA AND SULPHATE MILLS

Our service to pulp and paper mills on their recovery problems is based on many years' successful experience. Some of the largest installations in the United States and Canada are Swenson's.

Our engineers will gladly submit layouts and full description to anyone contemplating new construction.

Send for
Pulp Mill Circular P-123

SWENSON
Evaporator Co.
(Subsidiary of Whiting Corporation)
Harvey, Ill. (Chicago Suburb)



Standard Swenson Horizontal Tube, Triple Effect

from Belfast; American Express Co., 25 bls. from Glasgow; Goldman, Sachs & Co., 53 bls. from St. Nazaire; Guaranty Trust Co., 138 bls. from Glasgow; American Exchange National Bank, 44 bls. from Antwerp; Order, 199 bls. from Belfast.

Paper

Additional large arrivals of kraft wrapping paper featured the paper importations into the United States in October. Big shipments of wrapping were received at the port of New York from Sweden and Germany, the total running into many thousands of rolls and bales. News print imports were of fair volume, and usual amounts of cigarette, filter, hanging and other kinds of paper were imported. Receipts of paper of all kinds through the port of New York in October follow:

Cigarette

P. J. Schweitzer, 228 cs. from Antwerp; DeManduit Paper Corp., 245 cs. from Havre and 576 cs. from St. Nazaire; Rose & Frank Co., 301 cs. from Havre; Miguel, Costas & Miguel, 20 cs. from Barcelona; G. A. Henshaw & Co., 38 cs. from Havre; R. J. Reynolds Tobacco Co., 1,110 cs. from St. Nazaire; American Tobacco Co., 1,900 cs. from Bordeaux and 38 bls. from Liverpool; Surbrug Co., 10 cs. from Havre; M. Spiegel & Co., 2 cs. from Southampton; British-American Tobacco Co., 6 cs. from Panama.

Printing

C. Steiner, 35 cs. from Rotterdam, 36 cs. from Bremen and 25 bls. from Hamburg; Perry, Ryer & Co., 78 cs. from Glasgow; Chemical National Bank, 1,242 rolls from Hamburg; Seaman Paper Co., 435 rolls from Hamburg; Corn Exchange Bank, 183 rolls from Hamburg; Newsprint Paper Corp., 126 rolls from Gothenburg; B. F. Drakenfeld & Co., 64 cs. from Liverpool; J. L. N. Smythe & Co., 342 cs. from Hamburg; Columbia Trust Co., 148 rolls from Christiania; International Acceptance Bank, 444 rolls from Hamburg; J. P. Heffernan Paper Co., 42 rolls from Hamburg; G. & H. Transport Co., 134 rolls from Hamburg; C. H. Young Publishing Co., 313 rolls from Hamburg; C. K. MacAlpine & Co., 11 rolls from Rotterdam; Oxford University Press, 5 cs. from Liverpool; Newark Ledger, 197 rolls from Gothenburg; P. Puttmann, 14 cs. from Antwerp; H. Reeve Angel & Co., 72 rolls from Bremen; Parsons & Whittemore, 1,092 rolls from Bremen; First National Bank, 71 rolls from Hamburg; Fourth & First National Bank, 228 rolls from Hamburg; American Exchange National Bank, 104 rolls from Christiania; F. L. Collins, 45 bls. from Christiania; Order, 336 rolls from Copenhagen, 316 rolls from Rotterdam, 1,220 rolls from Bremen, 1,436 rolls from Hamburg and 19 bls. from Antwerp.

Wrapping

Irving Bank-Columbia Trust Co., 60 bls. from Venice, 148 rolls and 97 bls. from Gothenburg and 330 bls. from Hamburg; New York Trust Co., 810 rolls from Venice; J. B. Moors & Co., 578 bls. from Venice; Standard Underground Cable Co., 66 rolls from Glasgow and 5 rolls from Bremen; Publicity Paper Corp., 66 bls. from Trieste and 51 bls. from Hamburg; J. P. Heffernan Paper Co., 43 bls. from Trieste, 2,409 bls. from Gothenburg, 1,513 bls. from Hamburg and 232 bls. from Bremen; R. F. Downing & Co., 7 bls. from Hamburg; National City Bank, 539 bls. from Hamburg, 122 rolls from Bremen and 136 rolls and 8 bls. from Gothenburg; F. Walsh, 20 rolls from Hamburg; Wilkinson Bros. & Co., 996 bls. and 1,709 rolls from Hamburg and 95 rolls and 37 bls. from Rotterdam; Ladenburg, Thalman & Co., 1,037 rolls from Hamburg; Chemical National Bank, 1,707 rolls from Hamburg; W. Hartmann & Co., 3,765 rolls and 1,127 bls. from Hamburg; Maurice O'Meara Co., 208 bls. from Bremen; Corn Exchange Bank, 4,943 rolls and 245 bls. from Gothenburg and 200 bls. from Hamburg; C. G. Keferstein, 98 bls. from Bremen and 1,151 rolls from Hamburg; Fernstrom Paper Co., 5 rolls from Hamburg; D. S. Walton & Co., 5,264 rolls and 270 bls. from Hamburg; Blauvelt-Wiley Paper Co., 126 rolls from Hamburg and 102 bls. from Glasgow; Guaranty Trust Co., 64 rolls from Hamburg; Republic Bag & Paper Co., 138 rolls from Rotterdam; H. Reeve Angel & Co., 11 rolls from Hafslund; P. Rudolph Co., 7 rolls from Hafslund; T. D. Downing & Co., 171 rolls and 93 bls. from Rotterdam; C. K. MacAlpine & Co., 25 bls. from Gothenburg; Peoples Trust Co., 76 bls. from Hamburg and 2,349 rolls and 105 bls. from Gothenburg; Chase National Bank, 58 rolls from Hamburg; International Acceptance Bank, 694 rolls from Hamburg; A. E. MacAdam & Co., 1,415 rolls and 142 bls. from Gothenburg; Bernard, Judae & Co., 45 bls. from

COPYRIGHTED

Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

MOSINEE

presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

Mosinee Kraft

"The Wrapper that Delivers the Goods"

LOCKPORT, N. Y. NIAGARA FALLS, ONT.

F. W. ROBERTS MANUFACTURING CO.

All Products Guaranteed to Suit You

STEEL SHELL BURRS YELLOW JACKET SHOWER

Read the "ROBERTS IDEA"

SCREEN PLATES *and* **DANDY ROLLS**

Watermarking a Specialty

Central Manufacturing Co.

The Quick Service House

KALAMAZOO MICHIGAN

Remember

WM. A. HARDY & SONS

FITCHBURG, MASS.

Originators and Oldest Manufacturers

OF THE

Cast Bronze Screen Plate

ALSO SPECIALIZE IN

Acid Resisting Digester Parts

PERFORATED METAL SCREENS

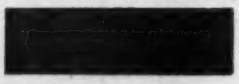
in all metals for pulp and paper mills
Elevator Buckets (Plain and Perforated)
Conveyor Flights and Trough
General Sheet and Light Structural Work
Light and Heavy Steel Plate Construction
Write for perforated metal handbook

HENDRICK MFG. COMPANY

Main Office and Works 51 Dundaff Street Carbondale, Penna. | 30 Church Street New York City | 544 Union Trust Building Pittsburgh, Penna.

UNION SCREEN PLATE CO.

Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada



UNION BRONZE SCREEN PLATES

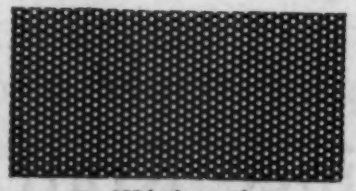
(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

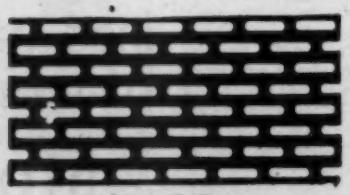
The Witham Screen Plate Fastener, Patented

THE ORIGINAL THE BEST

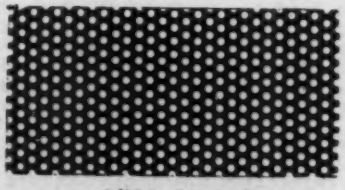
Perforated Metal Screens for Pulp and Paper Mills



.065 inch round



⅛ x ¾" Slots



3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

CHARLES MUNDT & SONS 57-65 Fairmount Avenue, Jersey City, N. J.

Hamburg; H. Reeve Angel & Co., 2,100 rolls from Hamburg and 2 cs. from Antwerp; F. B. Vandegrift & Co., 129 bls. from Hamburg; Chatham & Phenix National Bank, 14 rolls from Bremen; Equitable Trust Co., 412 rolls from Hamburg; Zellerbach Paper Co., 8 cs. from Bremen; Order, 42 bls. from Trieste, 1,918 bls. and 8,978 rolls from Hamburg, 715 rolls and 240 bls. from Gothenburg, 4,150 rolls from Rotterdam and 2,214 rolls and 154 bls. from Bremen.

Writing

H. Reeve Angel & Co., 5 cs. from Southampton; G. W. Sheldon & Co., 25 cs. from Southampton; Louis DeJonge & Co., 159 cs. from Marseilles; C. Steiner, 12 cs. from Bremen; Order, 5 cs. from Venice.

Drawing

American Shipping Co., 8 cs. from Rotterdam; Keuffel & Esser Co., 7 cs. from Liverpool, 60 cs. from Rotterdam and 160 cs. from Hamburg; E. Dietzgen & Co., 3 cs. from London and 4 cs. from Hamburg; H. Reeve Angel & Co., 3 cs. from London.

Filter

J. Manheimer, 13 bls. from Havre and 133 bls. from Southampton; E. Fougera & Co., 107 cs. from Southampton and 40 cs. from Bordeaux; H. Reeve Angel & Co., 24 cs. from London and 34 bls. from Bordeaux; F. Euler Co., 11 cs. from Rotterdam; Eimer & Amend, 10 cs. from Hamburg; Bernard, Judae & Co., 7 cs. from Gothenburg; Bankers Trust Co., 67 bls. from Bordeaux; C. G. Euler, 60 bls. from Bordeaux.

Tissue

F. C. Strype, 26 cs. from Liverpool; Meadows, Wye & Co., 7 cs. from Liverpool.

Photo

Gevaert Co. of America, 202 cs. from Antwerp; Globe Shipping Co., 62 cs. from Bremen; F. Henjes, 36 cs. from Bremen; M. G. Lange & Co., 2 cs. from Rotterdam; P. C. Zuhlke, 187 cs. from Antwerp and 20 cs. from Hamburg; J. J. Gavin & Co., 1 cse. from Liverpool.

Hanging

Coenca-Morrison Co., 9 cs. from Havre; W. H. S. Lloyd & Co., 1 cse. from Havre and 72 bls. from London; Erstein & Co., 11 cs. from Havre; A. C. Dodman, Jr., & Co., 78 bls. from Liverpool, 90 bls. from Southampton and 9 bls. from Antwerp; R. F. Downing & Co., 46 cs. from Yokohama; H. S. Pogue & Co., 3 cs. from Havre; F. G. Prager & Co., 1,743 bls. from Hamburg; C. G. Keferstein, 433 rolls from Hamburg; Order, 18 cs. from Antwerp.

Board

Friedman & Co., 24 cs. from Bremen; H. Maillard, 18 cs. from Havre; Bendix Paper Co., 84 cs. from Hamburg; Buschmann Bros., 218 rolls from Hamburg and 383 rolls from Rotterdam; Metropolitan Import & Mfg. Co., 119 cs. from Hamburg; Van Oppen & Co., 6 cs. from Havre; F. G. Prager & Co., 19 cs. from Hamburg; A. Vuyck, 134 rolls from Rotterdam; Maurice O'Meara Co., 12 bls. from Rotterdam; A. Bourjois & Co., 4 cs. from Havre; Coty, Inc., 86 cs. from Havre; Pulp and Paper Trading Co., 86 rolls from Rotterdam; Favor, Ruhl & Co., 4 cs. from London; Order, 40 bls. from Venice, 44 bls. from Trieste and 55 cs. from Hamburg.

Miscellaneous

Charles W. Williams & Co., 119 cs. from Antwerp; Borden & Riley Paper Co., 21 cs. from Antwerp; Japan Paper Co., 19 cs. from Havre, 2 cs. from London, 10 cs. from Gothenburg and 58 cs. from Yokohama; C. H. Boulin, 23 cs. from Havre; Quality Art Novelty Co., 66 cs. from Hamburg; Whiting-Patterson Paper Co., 25 cs. from Havre and 12 bls. from Rotterdam; Kronfeld, Saunders & Co., 15 cs. from London; H. Reeve Angel & Co., 8 cs. from Gothenburg; B. C. Ritchie, 25 cs. from Canton and 6 cs. from Yokohama; P. H. Petry & Co., 24 cs. from Hamburg; F. L. Kraemer & Co., 11 cs. from London; H. Brockelbank, 7 cs. from London; A. Frankan & Co., 6 cs. from Bremen; Irving Bank-Columbia Trust Co., 54 cs. from Antwerp; Union Trust Co., 20 cs. from Antwerp; Middleton Co., 1,224 rolls from Havre; Gimbel Bros., 5 cs. from Havre; R. F. Downing & Co., 5 cs. from Southampton; C. B. Richard & Co., 20 cs. from Havre and 21 cs. from Southampton; American Express Co., 36 cs. from Hamburg and 7 cs. from Havre; Birn & Wachenheim, 240 bls. from Hamburg and 51 bls. from Rotterdam; Coenca-Morrison Co., 3 cs. from Hamburg; G. W. Sheldon &

NORWOOD FILTERS

Clean Water
Low Maintenance Cost
Reliable

NORWOOD ENGINEERING CO.
FLORENCE, MASS., U. S. A.

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

Send for full particulars

Hungerford & Terry, Inc.
CLAYTON, N. J.

Established 1823
The
Smith & Winchester Mfg. Co.
SOUTH WINDHAM, CONN.

Manufacturers of

Paper Making Machinery

Paper Bag Making Machinery

The Undercut Trimmer

Die Cutting Presses

Overcut Cutters

Let Us Quote on Your Requirements

RECENTLY ISSUED

Technical Association Papers, Series VI (1923)

In paper, 208 pages, $3

A Theoretical Discussion of the Reactions of Papermaking: Jessie E. Minor.

Anti-Friction Bearings: G. H. Spencer.

Bibliography of Papermaking for 1922: C. J. West and A. Papineau-Couture.

Chemistry of the Alkaline Wood Pulp Processes: S. D. Wells and others.

Chemistry of the Sulphite Process: R. N. Miller and W. H. Swanson.

Discussion of papers.

Drying and Conditioning of Coated Paper: J. O. Ross.

Effect of Atmospheric Humidity on Paper Tests: P. L. Houston and H. S. Kirkwood.

Efficiency of Paper Drying: S. B. Jones and W. F. Goldsmith.

Evaporation of Spent Liquors: G. K. Spence.

Lake Color Manufacture: H. H. Holden.

Methods of Establishing Wage Rates and Determining Promotions: H. P. Carruth.

Papers on various subjects.

Paper testing; several papers.

Reports of committees.

Steam Economy in Pulp and Paper Mills: E. P. Gleason.

Steam Flowmeters on Sulphite Digesters: W. H. Kraske.

Study of Papermaking Materials: A. B. Green.

Use of White Water in Mechanical Pulp Mills: W. E. Brawn.

Ventilation of Machine Rooms: J. O. Ross.

Waste in the Industry: R. B. Wolf and G. D. Bearce.
White Water Losses and Their Correction.
Utilization of Barking Drum Waste.
Reduction of Broke Losses.

Technical Association of the Pulp and Paper Industry
18 East Forty-first Street **New York, N. Y.**

Cost Association *of the* Paper Industry

Headquarters

18 East 41st Street, New York City

Secretary-Treasurer, Thos. J. Burke, C. A.

EXECUTIVE COMMITTEE

C. A. JASPERSON...Nekoosa Edwards Paper Co.
COL. B. A. FRANKLIN.....Strathmore Paper Co.
S. L. BUSH.....Crocker-McElwain Co.
J. E. HYDE.....S. D. Warren Co.
JAS. A. REILLY....American Writing Paper Co.
M. P. BAKER.....(Ex Officio)
E. H. NAYLOR.....(Ex Officio)

COST SYSTEMS
COMMON SENSE
THEY GO HAND IN HAND

Join this Association and help put your industry on a sound, economic basis by promoting the use of proper cost estimating and cost finding methods.

"Supported by Manufacturers from Maine to California"

Co., 22 cs. from Havre; American Line, 17 bls. from Hamburg; Judson Freight Forwarding Co., 7 cs. from Havre; Interocean Forwarding Co., 2 cs. from Havre.

Foreign Trade Opportunities

Additional information regarding the following foreign trade opportunities issued by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce may be obtained from the Bureau in Washington, D. C., or its branch offices. It is requested that the number of the inquiry be given at all times.

No. 7914—Paper, all kinds, and old newspaper. Soerabaya, Japan. Exclusive agency desired.

No. 7955—Cutter of fiber paper board, guillotine hand power. Mazatlan, Mexico. Purchase desired.

No. 7947—Paper. Johannesburg, South Africa. Purchase desired.

No. 7956—Wrapping paper. Arecibo, Porto Rico. Agency desired.

No. 8016—Paper, reenforced waterproof, and waterproof boxes. Stockholm, Sweden. Purchase desired.

A. DeAngelis, Inc., Merged with Marquardt-Hewitt Corporation

Effective November 1, 1923, the business of A. DeAngelis, Inc., of Brooklyn, N. Y., will be consolidated with the Marquardt-Hewitt Corporation of 250 Front Street, New York. Ben DeAngelis and Andrew DeAngelis heretofore of the former concern, will join the latter organization and all business of the DeAngelis firm will be conducted from the offices and warehouse of the Marquardt-Hewitt Corporation.

A. DeAngelis, Inc., is one of the oldest paper mill supplies concerns in the New York trade. Founded more than 35 years ago, it has been at the forefront in the paper stock trade, and has operated one of the largest warehouses in this line in Brooklyn.

The Marquardt-Hewitt Corporation was organized about a year ago, and has made rapid strides since it started in business. It operates a large warehouse at 250 Front Street, running through to Water Street, and with the addition of the Messrs. DeAngelis and their experience and business clientele to its organization, the company's facilities and staff have been increased to enable it to greatly expand its operations.

Mathieson Alkali Lists 1924 Contract Prices

A letter received from the Mathieson Alkali Works, dated October 30th, gives the following new contract prices for 1924:

"Contracts for more than fifty tons per month of Liquid Chlorine in tank cars for delivery over the twelve months ending December 31, 1924, will be, until further notice, taken at three and three-eighths cents per pound, f. o. b. works. Prices in cylinders remain as previously announced.

"Contracts for Bleaching Powder for delivery over the same period, in standard drums, carload lots, will be, until further notice, taken at one dollar and thirty-five cents per hundred pounds, f. o. b. works.

"These prices are named for futures only, and are not being applied to reduce prices on deliveries on 1923 contracts."

du Pont Develops New Dye

The development of a direct dyestuff known as Pontamine Fast Blue SL is announced by E. I. du Pont de Nemours & Company. It is a clear bright blue of a reddish shade and is of valuable use in dyeing paper where resistance to sunlight is of prime importance.

This color before the war was imported from Europe and was regarded as a very important one because of its fastness to sunlight, without the necessity of aftertreatment. Its development in the United States now makes it available to American dye users as a native color.

Scott Co. Acquires "Walton" Trade Mark

The Scott Paper Company of Chester, Pa., has taken over the exclusive right, title and interest in the "Walton" Trade Mark label; formerly owned and controlled by the Peerless Manufacturing Company of Norristown, Pa., and used by them on Toilet Paper Rolls.

The assignment of this "Walton" Trade Mark to the Scott Paper Company was made under date of October 16, 1923.

BACK TO NORMALCY

Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

Will YOU let us show YOU how to make MONEY by making a

BETTER ACID

Don't forget that every second sulphite mill on this continent is using our towers, so ask your neighbor what HE thinks of them.

G. D. JENSSEN CO.
200 5TH AVE. NEW YORK, N. Y.

Guaranteed Perfect

Draper Hollow Balanced Brass Balls

FOR STUFF PUMPS

Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We make a specialty of repairing stuff pump balls.

We also manufacture—
SOLID BRASS BALLS
IRON AND STEEL BALLS
BALL CHECK VALVES
VALVE FACING TOOLS

The Draper Manufacturing Co.
Port Huron, Mich. **Petrolea, Canada**
Every ball bears our registered trade-mark

The Best Plant Investment You Ever Made

The Biggs Boiler Works Co. Akron Ohio

ISN'T it true that you have some equipment that you always think of as the best plant investment you ever made?

Biggs Rotary Bleaching Boilers make just such an appeal to hundreds of Mill owners, all over the world. And that satisfaction is based upon year in and year out performance of one or more Biggs Globe or Cylinder Rotary Bleaching Boilers.

The exactness with which the sectional plates are made (die pressed under hydraulic pressure); the hydraulically riveted seams; the metal to metal caulking; the precision of the final test—all these things are responsible for the ability of the Biggs Rotary Bleaching Boilers to stand up and give good, continuous service at the lowest possible upkeep cost.

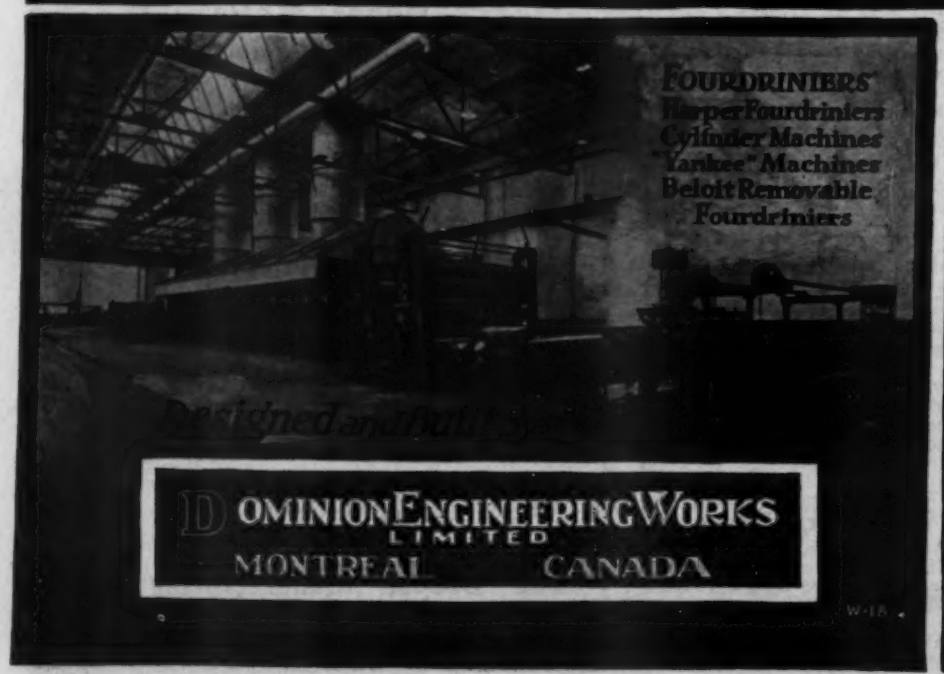
Globe and Cylinder Rotary Bleaching Boilers
Digesters
Riveted Steel Tanks
Flumes, Smokestacks, Penstocks,
General Steel Plate Construction of every description.

Make up your mind today to write for further information about these Bleaching Boilers. Get in the class with those who are able to think of their Boiler installations as the best plant investment they ever made.

The Biggs Boiler Works Company

Seneca Place and Case Ave. AKRON, OHIO

Paper Machinery



Plunger Stock Pumps—Single, Duplex & Triplex

"Frederick" Special Centrifugal Stock Pumps

Millspaugh Suction Couch & Press Rolls

Granite Press Rolls.

Calendar Stacks

Pope Reels

English Reels.